EXPERIMENTS WITH OXYGEN ON DISEASE

Tuberculosis, Bright's Disease. Et Al.

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EXPERIMENTS WITH OXYGEN ON DISEASE

Tuberculosis, Bright's Disease, Et Al.

BY

JAMES TODD, A.M.

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YOU ARE REQUESTED TO ACKNOW-
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By James Todd

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TO THOSE WHO HAVE AIDED THE WORK,

TO THOSE FOR WHOM IT WAS DONE

PREFACE

THE experiments of which I write were commenced in April, 1909, and are still being carried on.

In November, 1911, the work had progressed to a point that clearly showed it to be my duty to develop it to the utmost and to make public the results.

At this time, feeling that the responsibility was more than should be left to one man, I asked certain men prominent in the scientific life of Pittsburgh to aid me in designing and developing the work to be done, the result of which was the formation of what we call the Committee, the names and addresses of whose members follow:

Frederic L. Bishop, Ph.D., Dean of the Engineering School, University of Pittsburgh. Address: care University of Pittsburgh, Pittsburgh, Pa.

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It is my wish and the wish of each individual member of this Committee that it be clearly understood that we have no plan involving personal profit to us, either singly or collectively, from this work.

We write this book for a double purpose; on the one hand to make public the results of these exhaustive experiments; on the other, to ask for the aid which must be given if they are to be of any practical value to those who suffer.

We would ask our readers to bear in mind our statement now made; that we come before you to demonstrate principles, not cures.

To consider our work as completed would be as much of an error as to cast it aside, but it should be borne in mind that the lack of success often apparent, is due, not to the basic principles involved, but rather to our lack of knowledge in their application and our limited facilities.

Practically all of the inoculations and autopsies we use were made by Doctor E. W. Willetts, then pathologist of the Western Pennsylvania Hospital.

The rather unusual plan we are following in the controlled form of this publication is fully explained in the chapter "THE FINAL TEST."

It will perhaps be apparent to the reader that instead of making our experiments secondary to their form of publication we have deliberately made the publication submissive to our plans for the development of our work.

JAMES TODD

PITTSBURGH, PA.,
April, 1916

CONTENTS

PAGE
Preface v
The Theory upon which the Work was Based 1
In Explanation of the Drawings used 4
The Male Guinea Pig 6
The Natural Animal living in Accentuated Oxygen 17

THE FIRST SECTION OF THE ANIMAL EXPERIMENTS

The January Experiment 19
The August Experiment 25
The November Experiment 40
The Investigation Preceding the First May Experiment 51
The First May Experiment 57
Resistance to Tuberculosis Established 99
Conclusions based upon the First Section of the Animal Experiments 104
The Problem Confronting Us 113
    Nitrogen as a Possible Assistant to Oxygen 117
    Other Varying Factors 121

THE SECOND SECTION OF THE ANIMAL EXPERIMENTS

Preface 125
The Nitrogen Experiment 127
The March Experiment 141
The Principles Involved in the Process 150
The Significance of the Autopsies 154

THE THIRD SECTION

Nutritive Oxidation 158
Review 191
The Final Test 196

THE CHEMICAL AND MECHANICAL SECTION

Preface 199
The Ozone Theory 200
The Difference between So-called Ozone and Oxides of Nitrogen 201
The Effect of Magnetism on Ozonized Air 204
The Experiments with the Glass Tubes 208
What is So-called Ozone? 211
The Gas Distributor 215
The Testing of So-called Ozone 218
The Secondary Characteristics of So-called Ozone 222
The Power Plant 223

THE THEORY UPON WHICH THE WORK WAS BASED

It is not our intention at this time to deal in any detailed way with the theory which led to our undertaking these experiments, as to do so would be to provoke criticism and useless argument.

Our object is entirely restricted to a wish to place before the world the actual facts of our work so that judgment will be confined as much as possible to the facts, for it matters little, at this stage, how it was done so long as it has been done.

However, it would be both unwise and impolitic to undertake to explain the many and devious paths of the work without at least some statement of the underlying principles.

The tissues and the organs of the human body consist almost entirely of four elements, oxygen, hydrogen, carbon and nitrogen.

The food which maintains our bodies consists almost entirely of the same four elements; the air we breathe of oxygen and nitrogen.

Of these four elements two, hydrogen and carbon, are the two most prominent reducing agents within the chemical series. Oxygen is the one opposing power to reduction—oxidation—while nitrogen, the most mysterious of the elements entering into organic life, may well be an able assistant to oxygen.

Water is oxidized hydrogen, and carbonic oxide gas is but oxide of carbon.

Oxygen enters our bodies at both points of ingress, the stomach and the lungs, and it is of great significance that we find that nature chooses it as the only element to thus doubly enter our bodies. It has not been proved that nitrogen enters our bodies by the pathway of the lungs; neither has it been proved that it does not.

It is a fact of very great significance that nature, after she has expended the power of the elements derived from our food in maintaining our bodies, eliminates them always in combination with oxygen. The carbon comes out through our skin and our lungs as carbonic oxide, CO_2, the hydrogen as water, H_2O. Both elements are not only in combination with oxygen but are fully oxidized and are each held separately, as it were, in the grasp of their custodian and master, OXYGEN.

The simplest method of changing the condition of the organic chemical body is to change the ratio of any of these four elements, as by so doing we strike at the very foundation of life.

If the maintenance of the chemical equilibrium of our bodies is based by nature upon the broad foundation of oxidation and reduction, she would be operating upon very sound principles, easily within the comprehension of man, and which would fully justify us in calling oxygen the dominant element in organic life.

Under such conditions it might well be that when the living body is thrown out of its chemical equilibrium in such a way as to cause a slight predominance of the reducing agents, that it will lose its natural strength or power of resistance to disease.

Yet again, if such were to be the case and we were to re-supply that diseased body with oxygen in a form that is capable of entering and taking part in its chemical processes, we would restore the chemical equilibrium and react upon the attacking disease by removing, as it were, its sustenance; and further, if such is the case, a slight increase above the normal in oxygen would bring about a condition intensely vital both as regards force and accomplishment.

It is plainly apparent that we cannot hope to accomplish such ends by the use of normal oxygen, as either the living body or the oxygen will have to be intensified and as it is a much simpler method to intensify the oxygen we breathe than to undertake to intensify the living body, we use for our work so-called ozonized air, simply using it upon the ground that it is an intensified form of oxygen. So-called ozonized air would be far too powerful to use undiluted, so we use it by mixing a small, measured quantity with the air which is continuously blown into the rooms containing our animals.

As to whether we are right or wrong in our views and consequent deductions we will leave for the reader to determine from the results of our experiments.

IN EXPLANATION OF THE DRAWINGS USED

In studying such a problem as we have before us, it becomes essential that we have some fixed standard by which to judge, and for this purpose we have chosen the only one open to us, and yet the best possible one for the purpose—change in weight. Tuberculosis is a wasting disease and consequently the change in weight of the animals will be a reliable guide.

There are hundreds of animals that have passed through these experiments and to undertake to tabulate them in any form by means of figures would lead to such a mass of data as would deeply, if not completely, obscure the result. We have designed, therefore, a number of drawings which enable us to examine the exact history of each animal.

On the drawings which represent the weight changes, a curve is plotted for each animal, showing his weight at the time of inoculation and once each week thereafter. Each lateral space represents one week of time, while each perpendicular space represents one hundred grams. Accordingly, then, as the curve rises or falls it accurately shows the gain or loss in weight, while as it passes across the drawing it shows the interval of time by weeks. When the animal dies the curve ends thus, ⟍×, with a cross placed on the drawing to indicate both the weight and time of death.

As some of the strongest proofs of the fact that oxidation has been accomplished and that the body has risen in its forces as a result of oxidation, lie in the evidence obtained by first oxidizing certain animals before inoculation, it becomes necessary to have a plain marking to indicate such animals so that the contrast is always apparent.

In order to make this clear we mark all animals which have been oxidized before their inoculation thus, ⊕, using a circle with a plus mark across it.

For the natural animal, by which we mean the animal which has had no preliminary oxidation, we use the circle crossed by a minus mark, thus ⊖.

It is necessary to understand thoroughly these markings, for unless they are always kept clearly in mind it will not be possible to follow intelligently the proofs we submit.

We will, from time to time, use drawings based on characteristics other than the weight changes, and these will be explained as we come to them.

For the purpose of studying the effect of different inoculations and different treatments the animals will be divided into many classes and combinations as we proceed and a tremendous problem will be unfolded step by step. It is better to have this problem develop gradually than to state it here, but we emphasize the importance of the ⊕ and the ⊖, for in their contrasts, beyond all doubt, lies the truth.

Instead of marking each experiment with a number or a letter, we have dated them at the time on which they were started, as this prevents a repetition of numbers and takes us always to the origin. EXPERIMENT 1–14–10, for instance, started January fourteenth, 1910, and is therefore spoken of as EXPERIMENT 1–14–10 or as the January Experiment.

THE MALE GUINEA PIG

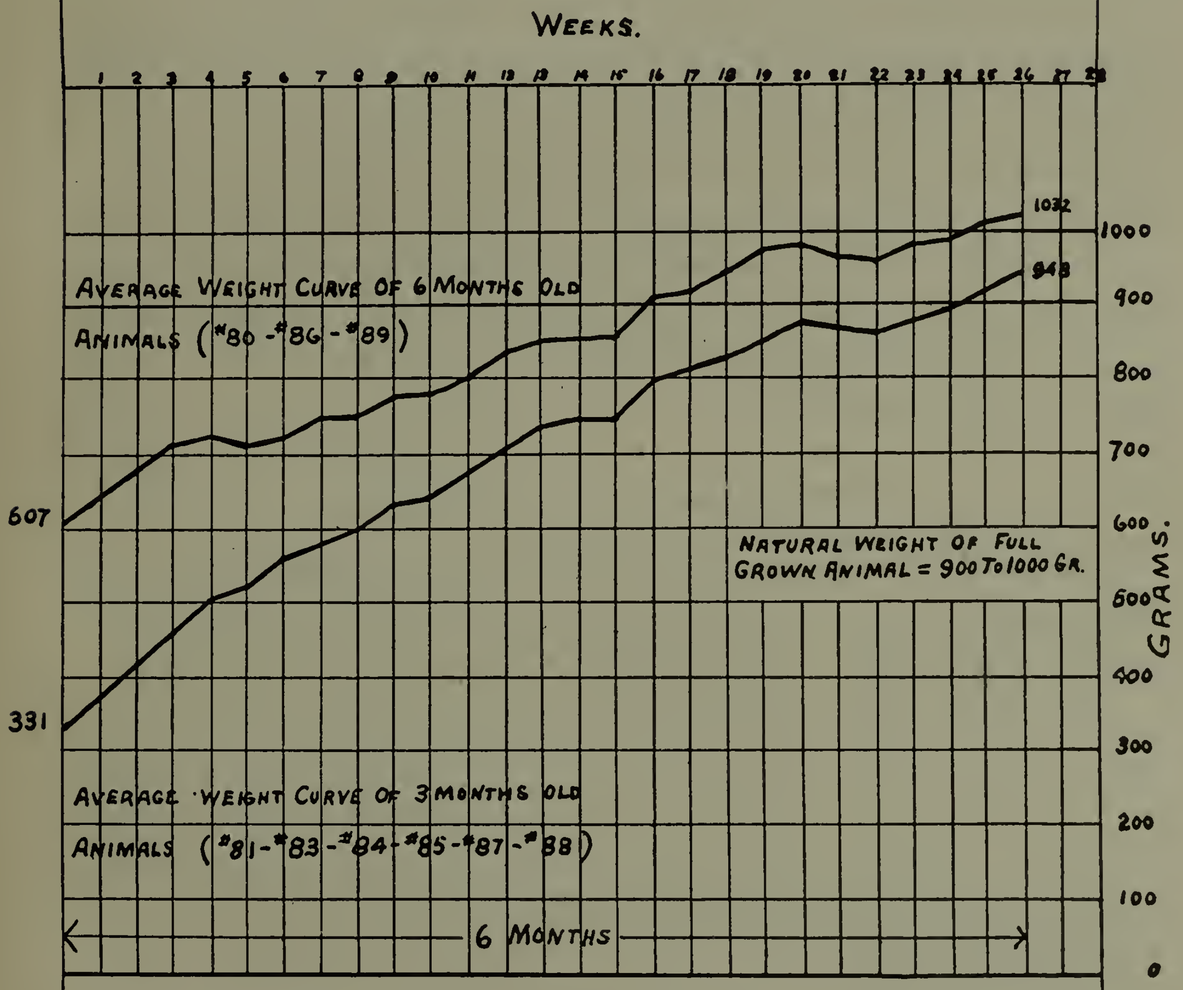
In order to intelligently handle our work it has become necessary for us to study, to a certain extent, the animal we use so freely, for we have never been able to find any reliable data in regard to it. This has been done from time to time as the work progressed and frequently in connection with the main problem.

In this chapter we give such reliable information as we have gathered in regard to the animal and its use for our purposes.

Our opinion of the guinea pig, based on a good many years of close intimacy with him and covering both observation and experiment, is that he is a delicate animal, requiring close and intelligent care in order to be reliably used; a care very different from that which he generally gets. His full adult weight is about one thousand grams, and he reaches maturity in about one year and does not ordinarily live much longer.

On page 7 is a drawing showing the natural weight curve of the male guinea pig. Nine animals are used, six very young and three half grown. Note as the weight increases the curve rises and as time progresses, passes to the right, week by week.

We have here, taken from our record books, two strongly rising curves covering a period of six months, the younger animals approaching the curve of the older ones; the whole amounting to such a representation of health and progress as we would expect to see. This is the curve we shall establish and from time to time use, in drawing the distinction between health and disease, making use of that section or portion of the curve which corresponds to the weight of the animals we employ in demonstration. For instance, if we are



SECTION OF
⟨EXPERIMENT 11-10-10⟩
LABORATORY BOOK #1 PAGE 93.

NATURAL WEIGHT CURVE OF THE MALE GUINEA-PIG.

Jas. Todd. JUNE 1911.

comparing animals weighing about five hundred grams, we shall take the section of the lower curve on this drawing at four weeks, as it there corresponds closely to such weights.

In this chapter the majority of the drawings used are based on the records made by the check or control animals. We distinguish between the check animal (whose record is always kept to show the development of the natural disease) and the animal placed under the conditions of accentuated oxygen, by speaking of the natural disease as unopposed tuberculosis, while those animals placed under the treatment are spoken of as opposed tuberculosis. That is to say the disease instead of following its natural course finds itself opposed by the force of oxidation.

THE CARE OF THE CHECK ANIMALS

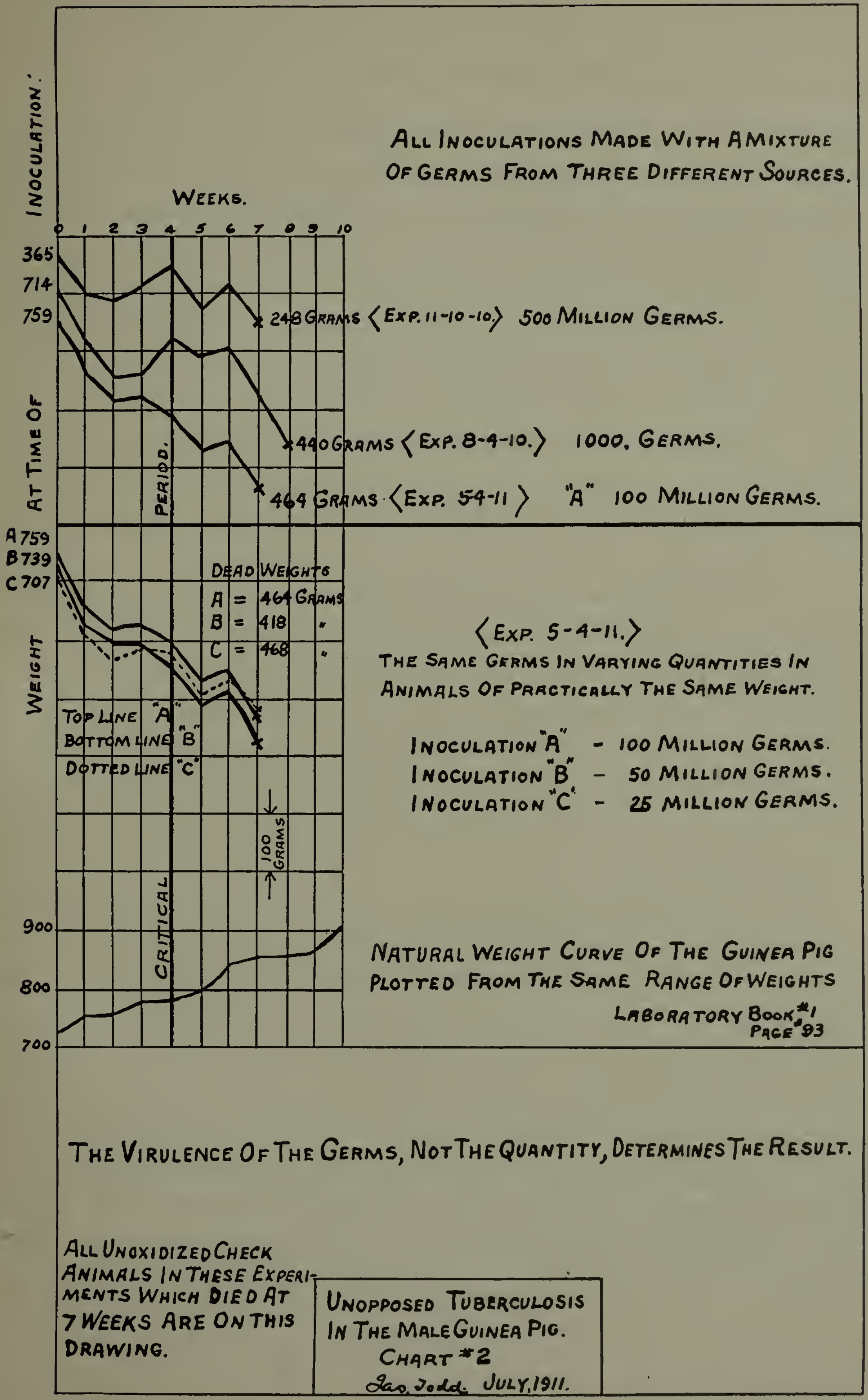
All animals used in our experiments have been either young animals obtained from a reliable source and kept by us for several months before using, or animals raised by ourselves.

The check animals used in the first four experiments were inoculated in our laboratories and then immediately taken to the laboratories of a prominent hospital and kept under the care of others than ourselves. Later all check animals were kept in our possession in clean, well-constructed outdoor cages containing warm, dry boxes for their protection.

With the exception of the first experiment, all animals have been inoculated identically; in the first experiment the number of germs varied with the size of the animal.

The check animals not in our care were fed, as nearly as we could arrange, identically with those under our treatment. The check animals kept by us were fed identically with those under our process.

On page 9 we place CHART NO. 2—UNOPPOSED TUBERCULOSIS IN THE MALE GUINEA PIG. We there state THE VIRULENCE OF THE


All Inoculations Made With A Mixture Of Germs From Three Different Sources.
Weight At Time Of Inoculation.
Weeks.
0 1 2 3 4 5 6 7 8 9 10
365
714
759
248 Grams ⟨Exp. 11-10-10.⟩ 500 Million Germs.
440 Grams ⟨Exp. 8-4-10.⟩ 1000. Germs.
464 Grams ⟨Exp. 5-4-11⟩ "A" 100 Million Germs.
Critical Period.
A 759
B 739
C 707
Dead Weights
A = 464 Grams
B = 418 "
C = 468 "
Top Line "A"
Bottom Line "B"
Dotted Line "C"
100 Grams
⟨Exp. 5-4-11.⟩
The Same Germs In Varying Quantities In Animals Of Practically The Same Weight.
Inoculation "A" - 100 Million Germs.
Inoculation "B" - 50 Million Germs.
Inoculation "C" - 25 Million Germs.
900
800
700
Natural Weight Curve Of The Guinea Pig Plotted From The Same Range Of Weights
Laboratory Book #1, Page 93
The Virulence Of The Germs, Not The Quantity, Determines The Result.
All Unoxidized Check Animals In These Experiments Which Died At 7 Weeks Are On This Drawing.
Unopposed Tuberculosis In The Male Guinea Pig.
Chart #2
Jas. Todd. July, 1911.

GERMS, NOT THE QUANTITY, DETERMINES THE RESULT. At first thought it seems unreasonable to say that the number of the tubercle bacilli which may attack us has little or nothing to do with the result, but with the fact demonstrated before us we soon see that it is reasonable, for when first we become infected it must be generally with a very small number of the same class of germs. They are certainly not moving around in great masses to plant themselves in one place. Still quantity must have something to do with the case. Common sense would tell us that one thousand of the same germs ought to attack at least a little stronger than one hundred could, and this is so, but to such a limited extent as to strengthen the proposition we have before us.

In order to fully understand this drawing and those which will follow it is perhaps well for us to state here that there are, in the first section of the animal work, four main experiments to be considered and that they were carried out in the following order: First, the January Experiment (EXPERIMENT 1–14–10), next the August Experiment (EXPERIMENT 8–4–10), then the November Experiment (EXPERIMENT 11–10–10) and last the First May Experiment (EXPERIMENT 5–4–11).

There are other experiments and at times they are presented, but the problem at the present time is mainly centered in these four.

In the inoculation of the animals we endeavored to use germs from three different human sources and by means of quantitative weights which were based on actual counts we obtained a definite and uniform inoculation, using a letter to represent each inoculation. "*A*" equals one five hundredth of a gram of the "pure" culture, equal to one hundred million germs. Each succeeding letter represents one half of the quantity represented by the previous letter; "*B*," therefore, equals fifty million germs, and "*C*" twenty-five million, and so on.

To return to the drawing, on the upper section of which are the weight curves of the check animals from the August, the November and the First May experiments, we find in EXPERIMENT 11–10–10 we have five hundred million germs; in the August Experiment (EXPERIMENT 8–4–10) but one thousand germs; while in the May Experiment (EXPERIMENT 5–4–11) there are one hundred million.

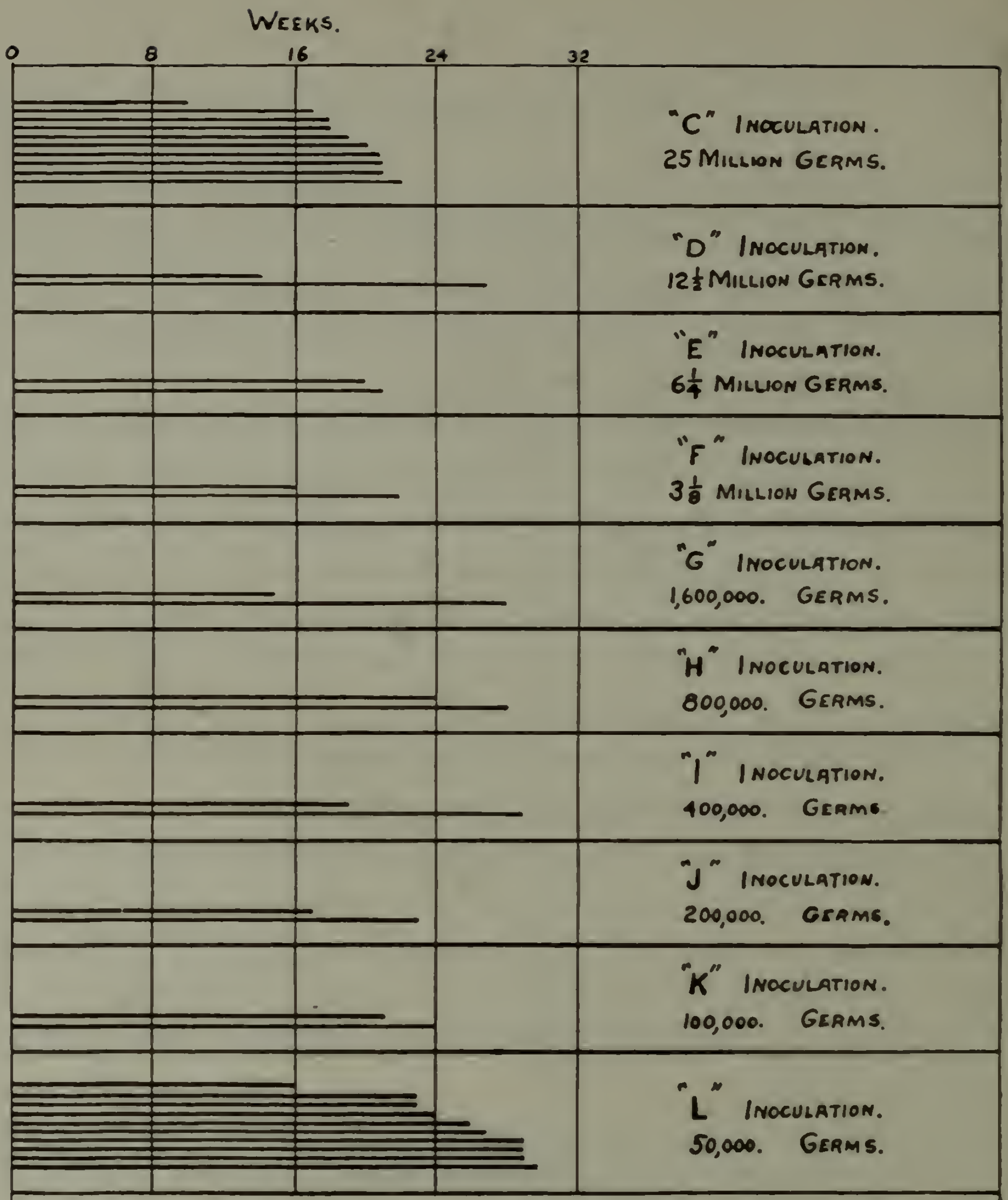
The curves show no material difference, and so support the statement that virulence controls. This proposition is also supported by the first May Experiment (EXPERIMENT 5–4–11) where three different inoculations, *A*, *B* and *C*, were used, representing one hundred million, fifty million and twenty-five million germs. In this experiment the same germs out of the same bottle were used on the same day and on animals of practically the same weights.

The curves actually intermingle; there is no difference.

Here first comes to view the all-important fact, viz: *virulence, not quantity, controls.* This being the case we must always design our experiments against the varying factor of the unknown inoculation. The enemy we are fighting is different each time and we know neither the form nor strength until long after the experiment has been started.

The curves shown on this drawing are strong and conclusive proof on this point, but on the drawing on page 12, UNOPPOSED TUBERCULOSIS IN THE MALE GUINEA PIG—CHART NO. 3, based on the Second May Experiment (EXPERIMENT 5–16–12) we have been able to reach out farther into this matter, and by a different demonstration again present the matter clearly and conclusively.

On this drawing it will be noticed that each succeeding inoculation is one half in number of the same germs as the preceding one; that there are ten animals in the first and last groups, the heaviest and the lightest inoculations, and that the connecting groups are of two animals each. On the drawing the length of life of the animal is



The Virulence Of The Germs, Not The Quantity, Determines The Result.

The Distinctions Only Emphasize The Fact.

Using All Check Animals From Experiment 5-16-12.

Life Lines $\frac{1}{8}$" = 1 Week.

Unopposed Tuberculosis
In The Male Guinea Pig.
Chart #3.
Jas. Todd. February, 1913.

represented by a straight line. On the original drawing one eighth of an inch equals one week.

In studying the extreme groups of animals no material distinction can be found when we consider that twenty-five million germs were placed in the upper group of animals while but fifty thousand were in the lower. The distinctions are so slight that we can pass on, having again established the fact, viz: virulence, not quantity, controls.

We place on page 14 the drawing Unopposed Tuberculosis in the Male Guinea Pig—chart no. 1. This drawing shows the clock-like precision of unopposed tuberculosis. The system resistances are clearly shown and particular attention should be given to the uniformity of the blow as indicated by the heavy line at the fourth week. The autopsies show this to be the time of general involvement of the vital organs.

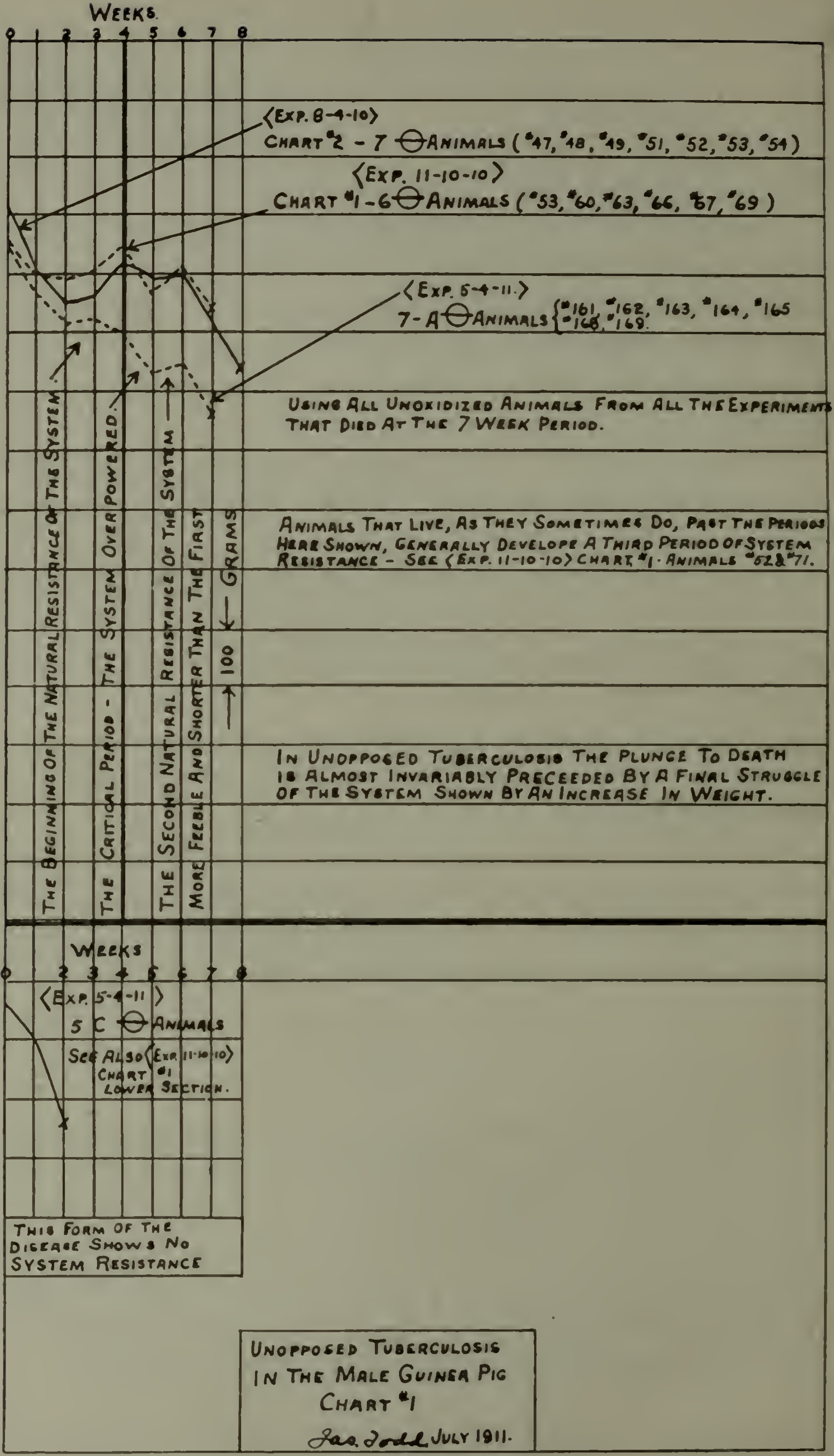
We turn now to page 15, Evidences of Oxidation—Check Animals—chart no. 1, and take up the question of whether it is possible and practical to oxidize the living body.

This chart is based on what we call Common Root Charting, that is, each pair of lines start from a common point or root and then rise or fall as shown by their records in the laboratory books.

As it is necessary to chart together only such animals or groups of animals as die at the same time, notice that only small groups of animals, and not the same in number in each case, are charted together.

The effort has been to demonstrate with animals that die at seven weeks, because most of the deaths occur then and by that time the disease is fully developed.

On this drawing so explained we wish to draw attention to the fact that in each case the top curve is the weight changes of the animal oxidized before inoculation, *i. e.*, the ⊕ animal; while the lower curve, in each case, is that of the natural animal, *i. e.*, the ⊖.



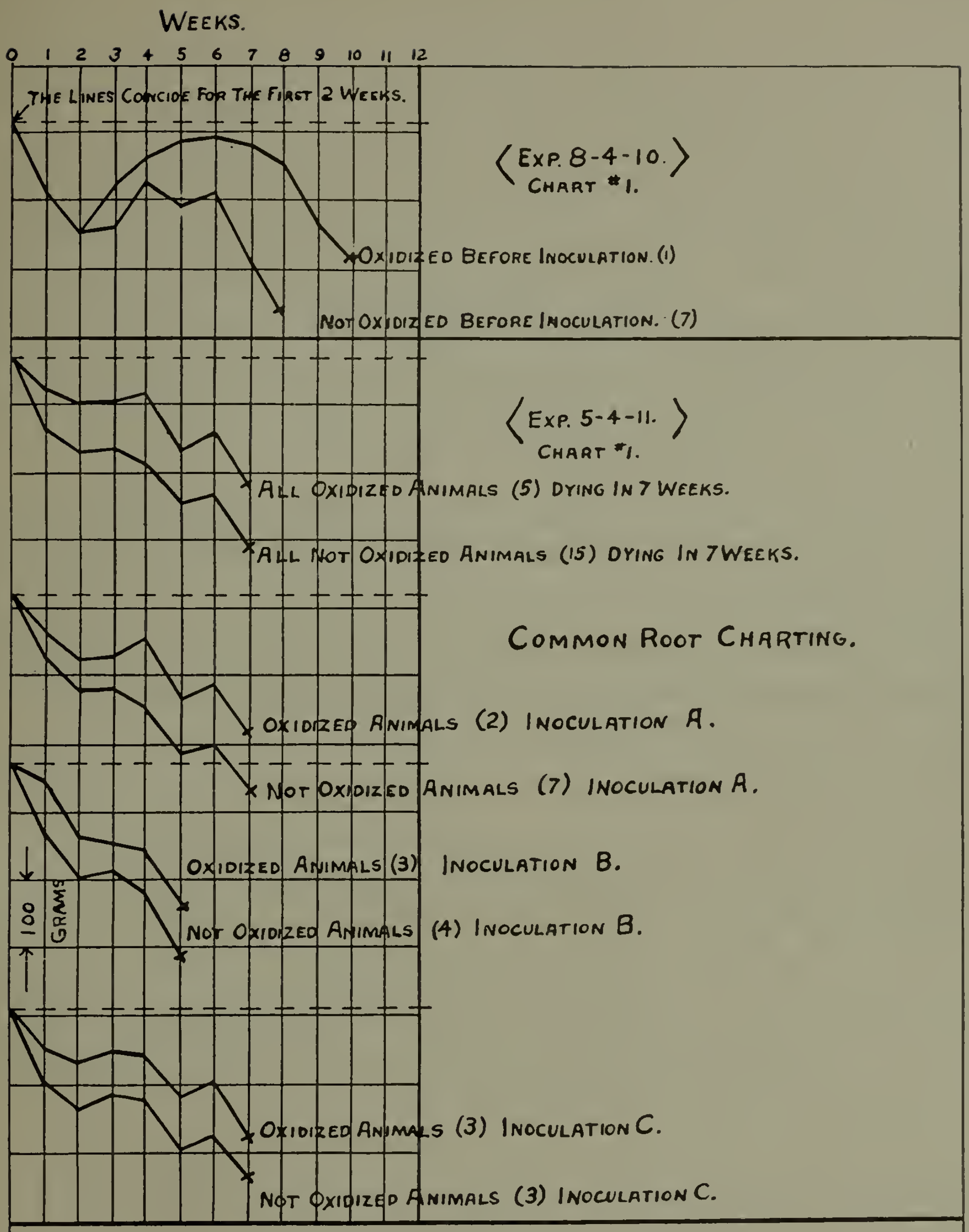
USING ALL UNOXIDIZED ANIMALS FROM ALL THE EXPERIMENTS THAT DIED AT THE 7 WEEK PERIOD.

ANIMALS THAT LIVE, AS THEY SOMETIMES DO, PAST THE PERIODS HERE SHOWN, GENERALLY DEVELOPE A THIRD PERIOD OF SYSTEM RESISTANCE - SEE ⟨EXP. 11-10-10⟩ CHART #1 · ANIMALS #52 & #71.

IN UNOPPOSED TUBERCULOSIS THE PLUNGE TO DEATH IS ALMOST INVARIABLY PRECEEDED BY A FINAL STRUGGLE OF THE SYSTEM SHOWN BY AN INCREASE IN WEIGHT.

THIS FORM OF THE DISEASE SHOWS NO SYSTEM RESISTANCE

UNOPPOSED TUBERCULOSIS
IN THE MALE GUINEA PIG
CHART #1
Jas. Todd JULY 1911.



EVIDENCES OF OXIDATION.
CHECK ANIMALS.
CHART #1.

Jas. Dodd. JULY, 1911.

As the curves start from a common point we have here a clear and uniform distinction, in that the natural animal loses more weight before death than the one which has been previously exposed to accentuated oxygen. While it is true that they both must die because not exposed to oxidation *after* inoculation, yet the record is clear that something has happened to cause the oxidized animal uniformly to lose less weight.

Practical oxidation is proved to have been accomplished, without any injury to the animal, and the animal has shown more strength because of it.

This is the first example of the difference between the O plus and the O minus and it will be noted that the distinctions are decisive.

EXPERIMENT 11-26-09

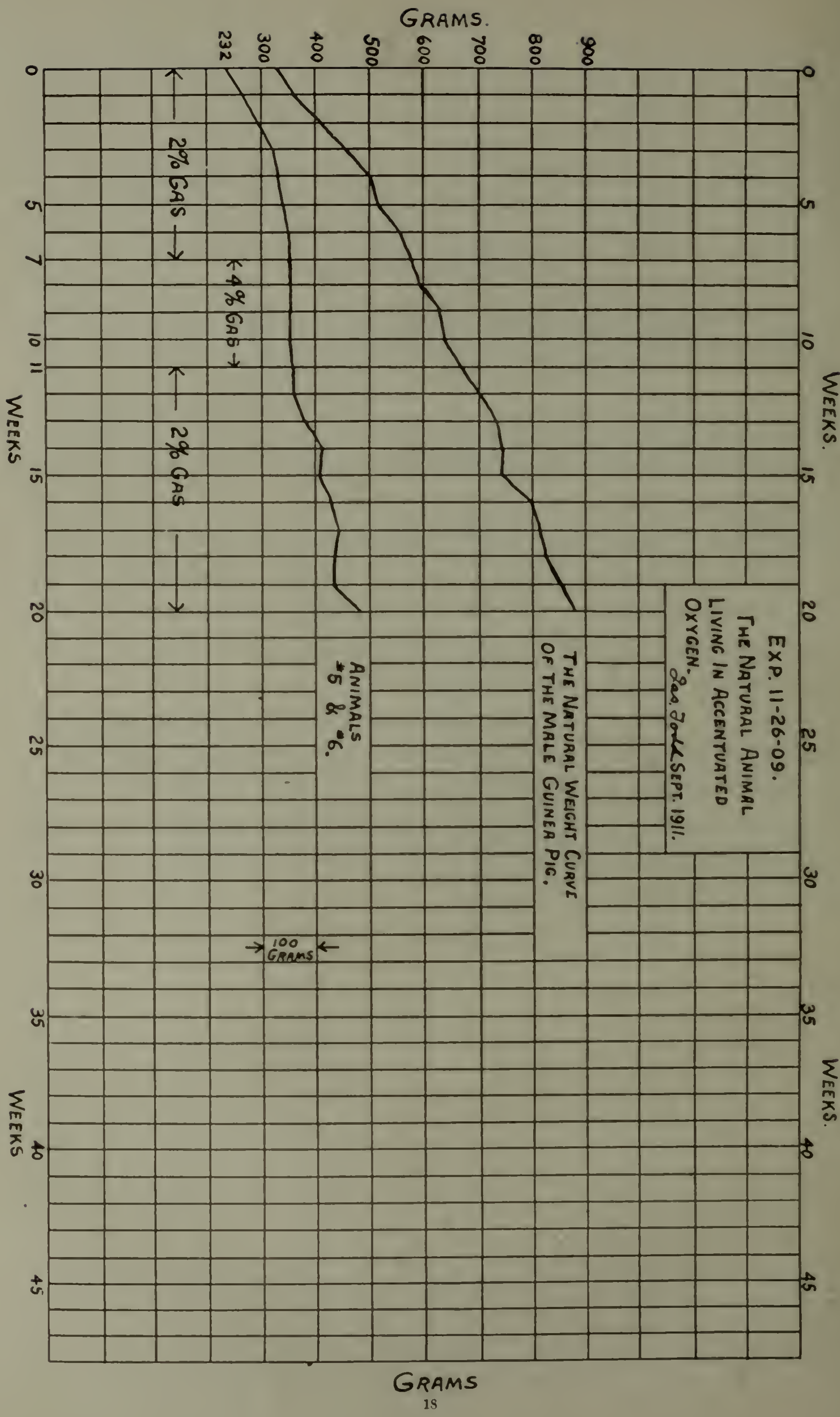
THE NATURAL ANIMAL LIVING IN ACCENTUATED OXYGEN

We have clearly shown in the previous chapter that oxidation can be and has been accomplished; but before proceeding with the inoculation of the animals it is necessary for us to show that the animal can live and thrive under the conditions we intend to produce.

On the drawing on page 18, we place the natural weight curve of the animal and below this the curve of two animals carried, first in two per cent. of the so-called ozonized air, then in four per cent. and later again in the two per cent.

Note that the curve rises under two per cent.; neither rises nor falls when the gas is raised to four per cent.; and again becomes a rising line as soon as the gas is lowered to two per cent.

That the animals can and do live and thrive under such conditions is clearly shown both here and in the work to follow.



Exp. 11-26-09.
The Natural Animal
Living in Accentuated
Oxygen.
Jas. Todd Sept. 1911.

THE FIRST SECTION OF THE ANIMAL EXPERIMENTS

EXPERIMENT 1–14–10

THE JANUARY EXPERIMENT

This, the first inoculation experiment, was made without any definite plan other than to inoculate the animals with the tubercle bacillus and expose part of them to intensified oxygen in the belief that the ones so exposed would show the benefit of their experience.

The number and virulence of the germs used is unknown but was excessive, as shown by the fact that all the check animals died within a few days.

The inoculation was made subcutaneously in the abdominal region and in this experiment we used a varying quantity of the inoculating fluid, using slightly more on the heavier animals than on those that were lighter in weight, a system which we abandoned after this experiment.

In all, we inoculated nine animals, four check animals and five placed under the treatment.

Of the check animals, three were inoculated with the full quantity of inoculating fluid, but the fourth was given a smaller quantity, as the inoculating fluid gave out.

Of the four check animals, the three heavily inoculated ones died, one each day, so that all were dead in four days. The lightly inoculated one lived for nine days.

There are no autopsies of the check animals because they did not live long enough to have their organs attacked. In each one the tubercle bacilli were found where they had been placed.

Eliminating the lightly inoculated check animal for that reason, we have the plain fact that all the check animals died within a few days after their inoculation.

Now turning to the five animals inoculated and placed under intensified oxygen, we find that they were divided into two classes, as three of them were previously oxidized, to raise their forces by the power of intensified oxygen before their ordeal, while the other two were natural animals.

We here meet for the first time the distinctions that are shown by the two classes of animals, the ⊕ and the ⊖ (the O plus and the O minus), the body prepared for its ordeal by preliminary oxidation as compared to the natural animal passing through the same ordeal, and we would again call attention to this phase of the work so that the distinction between the two classes of animals may be fully appreciated, as in this lies the very pith of the questions involved.

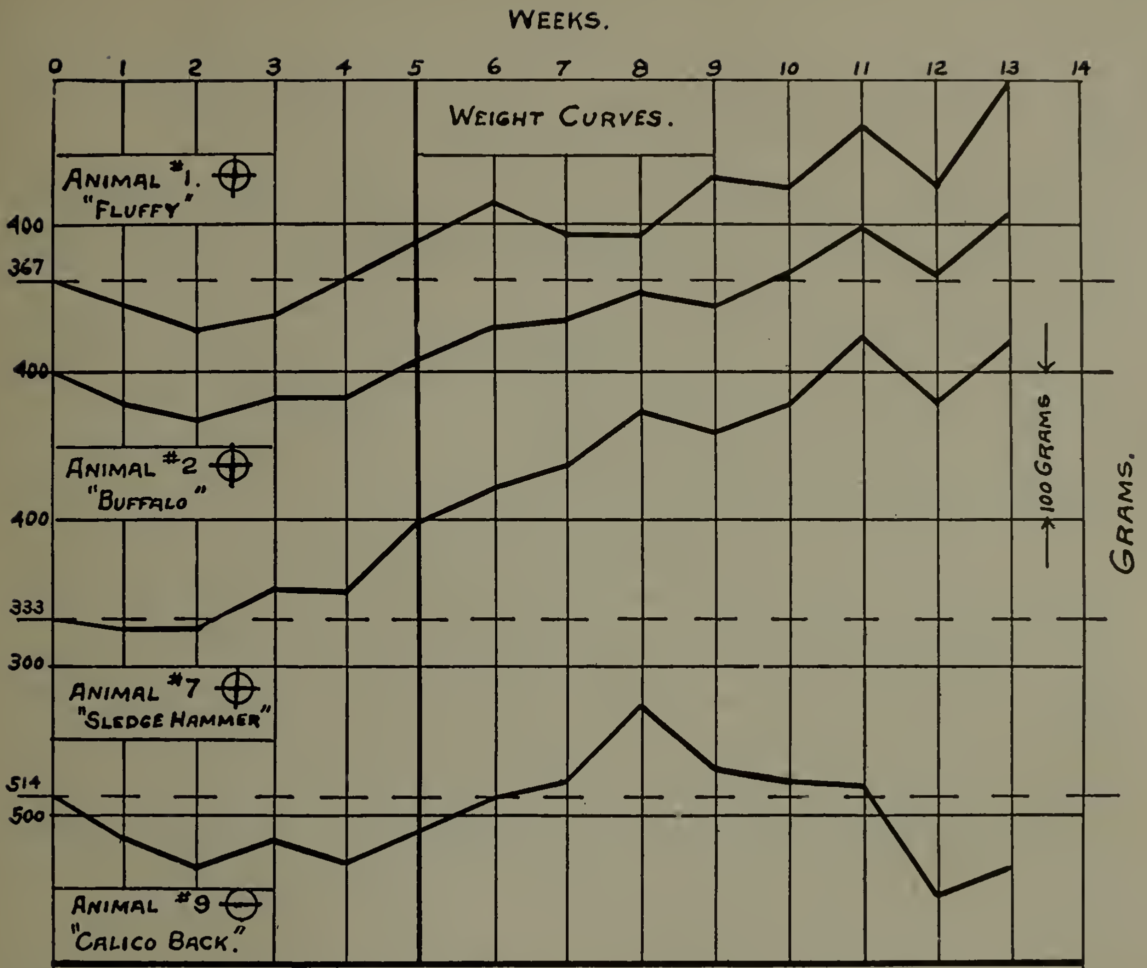
Of the two natural animals, one died fourteen days after its inoculation. Noting that this natural animal lived fourteen days under the treatment as compared to the death of the check animals within four days, we will take up the drawing EXPERIMENT 1–14–10, ANIMALS UNDER TREATMENT, page 21.

On the upper section of the drawing we have placed the weight curves of the four remaining animals for the period of thirteen weeks at which time they were chloroformed and extensive autopsies performed.

On the lower section of the drawing we have placed the results of the autopsies. The markings used are all explained on the drawing.

Returning to the weight curves, we find that the three upper animals, No. 1, No. 2 and No. 7, are the previously oxidized ones, marked with the sign ⊕.

Bearing in mind that the check animals all died in a few days, we see these animals lose weight heavily for two weeks after their



Autopsies.

Animals Chloroformed And Autopsied 3 Months After Inoculation.

No.	Glands Near Inoculation Point	Glands General	Spleen	Liver	Kidneys	Lungs	Brain	Change in Weight	Condition of Body	Is Tubercular Healing Present?	
1	o	o	o	o	o	x	o	+130	Good	Yes	⊕
2	o	o	o	x	o	x	o	+102	Good	Yes	⊕
7	xxx	o	o	o	o	x	o	+187	Good	Yes	⊕
9	xx	x	xx	xx	o	x	xx	- 59	Poor	Yes	⊖

Animals #1 - #2 - #7 Were Oxidized For 50 Days Before Inoculation Under (Exp. 11-26-09)

Animal #9 - A Natural Animal.

x = Organ Involved.
xx = Organ Heavily Involved.
xxx = Caseation Present.
o = Organ Not Involved.

Experiment 1-14-10.
Animals Under Treatment.
Jas. Dodd. February 1913.

inoculation and then move forward with a strength that is marvelous and that proves, beyond question, that some force is within them and acting for their benefit.

That the power of the intensified oxygen has uniformly acted on all alike is shown by the close conformity of the weight curves.

Now we will compare animal No. 9, the natural, or ⊖ one, with the three previously oxidized, or ⊕ ones.

The first noteworthy comparison that we will make in his case is that the check animals, having no intensified oxygen to aid them in their battle for life, were all dead at the end of four days, *while he lives to be chloroformed at the end of three months*, as thus he proves that the process holds hope of success for those which have not been exposed to its power before the disease has attacked them.

In comparing this natural animal's weight curve with the weight curves of the other three, we find that may distinctions are shown in favor of the three ⊕ animals.

At the first glance we see that his curve does not keep up parallel to the others; it being a much weaker effort than the ⊕ ones.

In further studying the details of his curve we find that while the power of the oxygen started him upward during the third week in common with the others, yet he did not hold his gain, as shown by the fact that he lost weight during the following week and undoubtedly he lost his fight at the eighth week and could not have lived much past the time when he was chloroformed, and at the end of his life weighed much less than when inoculated, as compared to exceedingly heavy gains in all the ⊕ ones.

Much might be here said in regard to the distinction between the weight curve of this natural animal and those of the three which were prepared for the ordeal by first deliberately exposing them to the power of intensified oxygen, but we would rather at this time allow the reader to draw his own conclusions, simply stating that this undeniably clear evidence is maintained through the records of the hundreds of animals that will be shown as the work progresses and the problem commences to assert itself.

On the lower section of this same drawing we have placed in tabulated form the autopsies of the four animals.

We believe that the simplicity of the design by which we show these autopsies renders detailed explanation of them unnecessary and so will leave them to speak for themselves.

Animal No. 7. The abscess formed at the point of inoculation in this animal had not opened at the time of chloroforming him, which fact accounts for the heavy involvement at this point; the abscesses in the others had opened some time before.

The autopsies show that all the animals were lightly involved in the lungs; in the ⌖ ones there was no other evidence of the disease, except that it was lightly present in the liver of No. 2 and in the abscess above referred to in No. 7.

The autopsy of No. 9 shows practically all of his organs heavily involved and that he had lost fifty-nine grams in weight, as compared to the heavy gains shown by the ⌖ ones, which gains average one hundred and forty grams to each of the animals.

We would call attention to the fact that tubercular healing was found to be strongly and repeatedly present in each of these four animals, *thus proving that the power of intensified oxygen not only can oppose the power of the tubercle bacillus, but can also force it from its prey and heal the organs it has ravaged.*

⊕
4 Oxidized Animals.
#1 To #4

1% Gas.

⊖
6 Natural Animals.
#5 To #10

⊕
4 Oxidized Animals.
#11 To #14

2% Gas.

⊖
6 Natural Animals.
#15 To #20

⊕
4 Oxidized Animals.
#21 To #24

3% Gas.

⊖
6 Natural Animals.
#25 To #30

⊕
4 Oxidized Animals.
#31 To #34

4% Gas.

⊖
6 Natural Animals.
#35 To #40

⊕
3 Oxidized Animals.
#41 To #43

Check Animals.

⊖
11 Natural Animals.
#44 To #54

⟨Exp. 8-4-10.⟩

Plan Of The Experiment.

54 Animals Divided Into 10 Sections.

Object Of The Experiment.
Different Quantities Of The Gas Acting On A Light Inoculation.
Inoculation 1000 Tubercle Bacilli Of Human Origin.
Preliminary Oxidation For ⊕ Animals 1% Gas 1 Week – 2% Gas 7 Weeks, Oxidized Under ⟨Exp. 6-6-10.⟩ R.B. Page #3.
Record Book Pages #5 To #37 Inclusive.

Jas. Todd Sept. 1911.

EXPERIMENT 8–4–10

THE AUGUST EXPERIMENT

In this experiment we have endeavored to bring system and a well-considered plan into our work that we may accomplish as much as possible and, at the same time eliminate, as far as possible, errors and the consequences of poorly considered plans.

On page 24 we place the full plan of the experiment.

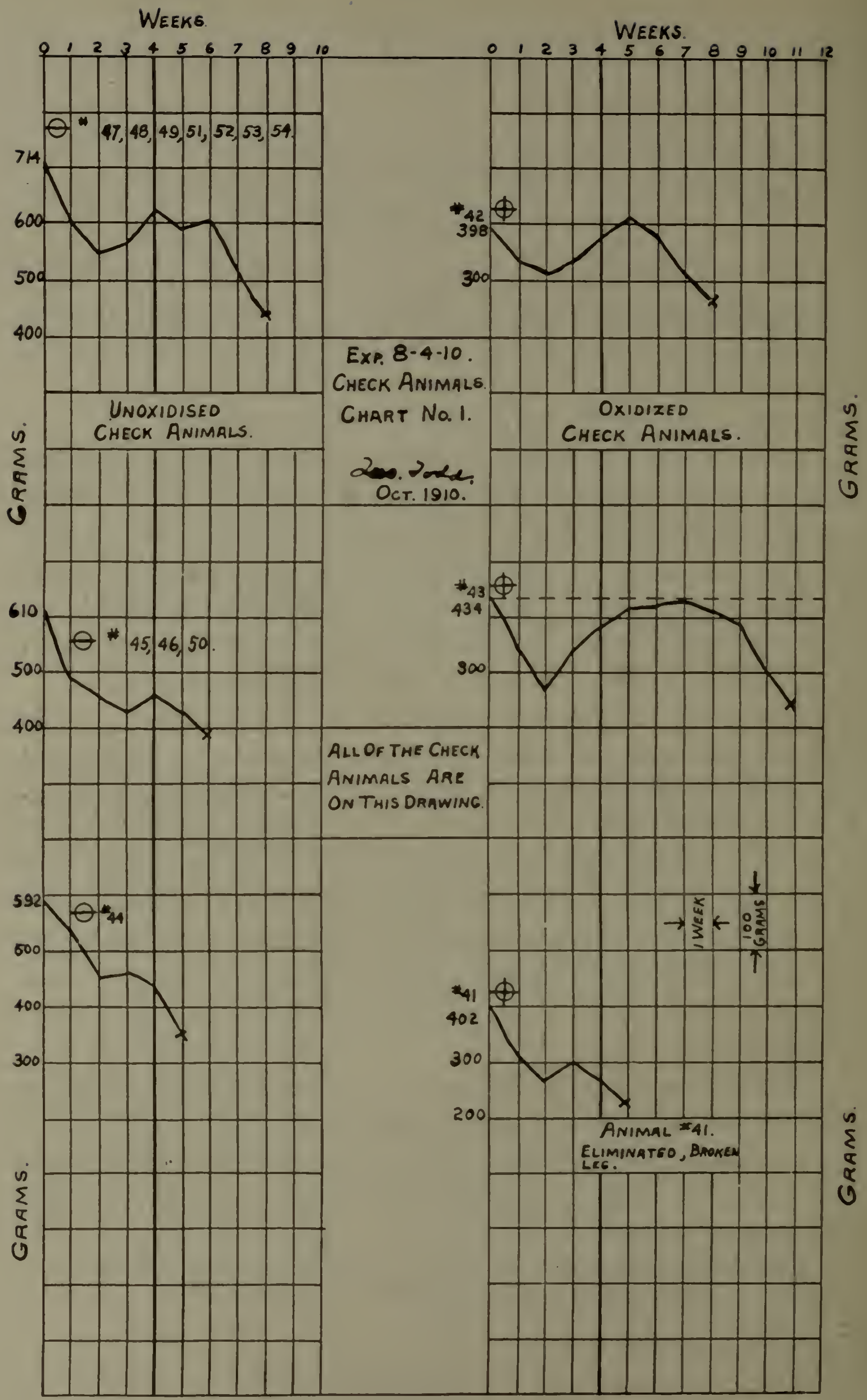
The experiment involved fifty-four animals divided into ten sections and was designed for the purpose of determining the effect of different quantities of the oxidizing gases as well as the carrying of both the previously oxidized and the natural animals through all sections of a much larger and more comprehensive experiment than the January one. All of the details of the experiment are shown upon the plan and should be given close consideration.

At the very start a mistake was made that has cast a shadow upon this otherwise very conclusive experiment; the doctor who performed the inoculations misunderstood his instructions, which were to inoculate the animals just under the skin in the abdominal region, thus securing a fostering point for the germs to spread from, but instead of so doing he injected the germ solution *into* the abdominal cavity; the germs, few in number, became scattered and, while killing all the check animals, did not cause definite tubercular lesions, so that we have no autopsies showing the check animals to have died of tuberculosis.

Fortunately, there are other ways of attaining the necessary information, which we will state in their proper place.

Leaving the plan, we will now take up the results attained, commencing with the check animals, all of which are shown on Chart No. 1, page 26.

There were eleven natural check animals which are marked ⊖,



EXP. 8-4-10.
CHECK ANIMALS.
CHART NO. 1.

Geo. Todd.
OCT. 1910.

UNOXIDISED
CHECK ANIMALS.

OXIDIZED
CHECK ANIMALS.

ALL OF THE CHECK
ANIMALS ARE
ON THIS DRAWING.

ANIMAL #41.
ELIMINATED, BROKEN
LEG.

both on the plan and on this drawing. In addition to the natural check animals, the plan shows three previously oxidized check animals marked with the sign ⌖.

The experiment carried nineteen of the ⌖ animals in its different sections. They, in their preliminary oxidation, were exposed to one per cent. of the so-called ozonized air mixed with ninety-nine per cent. of pure air, the mixture being blown continuously into the room in which they lived for one week and then the "ozonized" air was increased to two per cent. for eight weeks.

Their full curve during their period of preliminary oxidation is given on Chart No. 4, page 33.

The method followed, in oxidizing all the animals used in all of our experiments, has been to procure enough animals for the full experiment and keep them in good, clean, well-ventilated pens for not less than a month and generally several months, until they were mature enough for our purpose and known to be perfectly healthy.

They were then divided impartially into two groups. One of these groups would be then oxidized for from eight to ten weeks, while the other group would be kept away from the vicinity of the oxidizing gases.

In all cases the feeding and cleaning of the animals were identically the same for each group and great care was taken that no factor should vary in the two groups excepting the one of oxidation, *and no other factor did vary.*

We have here gone into full detail that this question may be fully understood.

Returning to our drawing CHECK ANIMALS—CHART NO. 1, page 26, we find on the left side of the drawing all the natural check animals and on the right side of the drawing the three oxidized, or ⌖ ones.

It will be noticed that the eleven natural check animals are shown by means of three weight curves, the top curve consisting of seven animals, the middle curve of three and the lower curve of one animal; this is because animals dying at different periods cannot be charted together, as the lines would falsify themselves.

Animal No. 41, ⊕, on lower right side of drawing. This animal's leg was broken when inoculating it and for that reason we eliminate it from further discussion.

There are cases of elimination of animals in the work necessarily caused by the large number used; they are few and the record of each one is given in its proper place.

A glance at the drawing is sufficient to show that there is a great difference between the curves of the ⊖ and the ⊕. The greater strength of the ⊕ ones is shown by their complete recovery of the weight lost in the first two weeks after inoculation, while none of the ⊖ come any way near this attainment.

It cannot be denied that here we find the previously oxidized check animals, which have been deprived of the intensified oxygen since the time of their inoculation, showing exactly the characteristics that we found in the ⊕ animals carried in the previous experiment—greater strength and greater recuperative power, and this is exactly what the proper form of oxygen properly placed in their bodies should do.

Turning to CHART NO. 2—COMPARISONS, page 29,[1] we find a new method of demonstrating, which we call "common root charting" and which requires a word of explanation, as we frequently use it.

In this method of demonstrating the results, the curves are started from a common point and from that point rise or fall each week in accordance with the weight changes of the animals and the separation of the curves is what tells the tale.

On the upper part of the drawing we bring into comparison the

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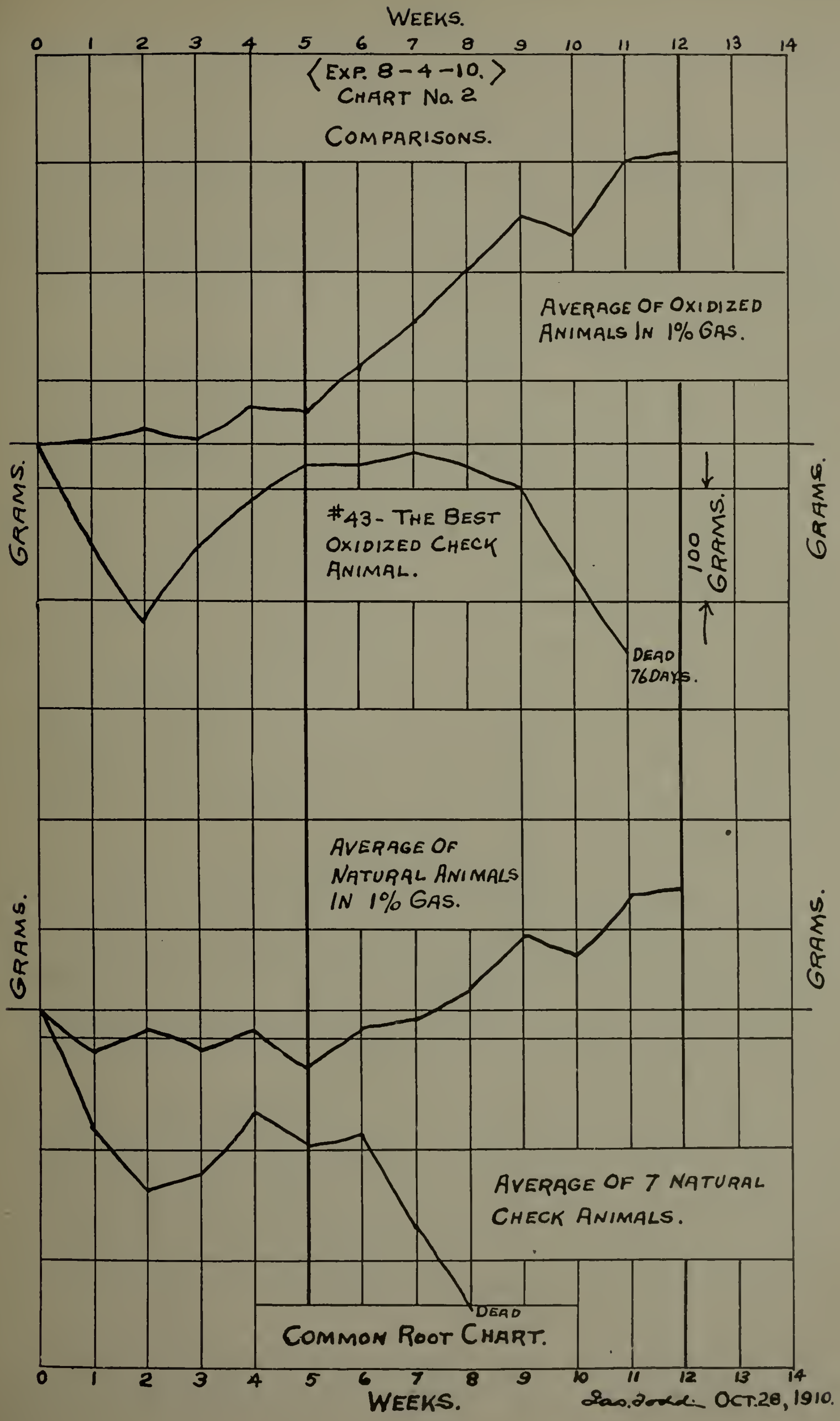
[1] The reader will please note that when we speak of using two per cent. of gas, or two per cent. of "ozone," that we mean a given percentage of "ozonized air."


WEEKS.
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
⟨EXP. 8-4-10.⟩
CHART NO. 2
COMPARISONS.
AVERAGE OF OXIDIZED ANIMALS IN 1% GAS.
GRAMS.
#43- THE BEST OXIDIZED CHECK ANIMAL.
DEAD 76DAYS.
100 GRAMS.
AVERAGE OF NATURAL ANIMALS IN 1% GAS.
AVERAGE OF 7 NATURAL CHECK ANIMALS.
DEAD
COMMON ROOT CHART.
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
WEEKS.
Jas. Todd OCT. 28, 1910.

oxidized check animal which made the best record and the average of all the oxidized animals carried in one per cent. of the oxidizing gases after inoculation for the purpose of showing the power of oxygen maintained during the struggle precipitated by the inoculation.

The check animal died, the others did not.

On the lower part of the drawing we compare the curve of the seven natural check animals that lived the longest with all the natural animals carried in one per cent. of the gas after inoculation.

Note that again the word "dead" appears on the check animal's curve but not on the other.

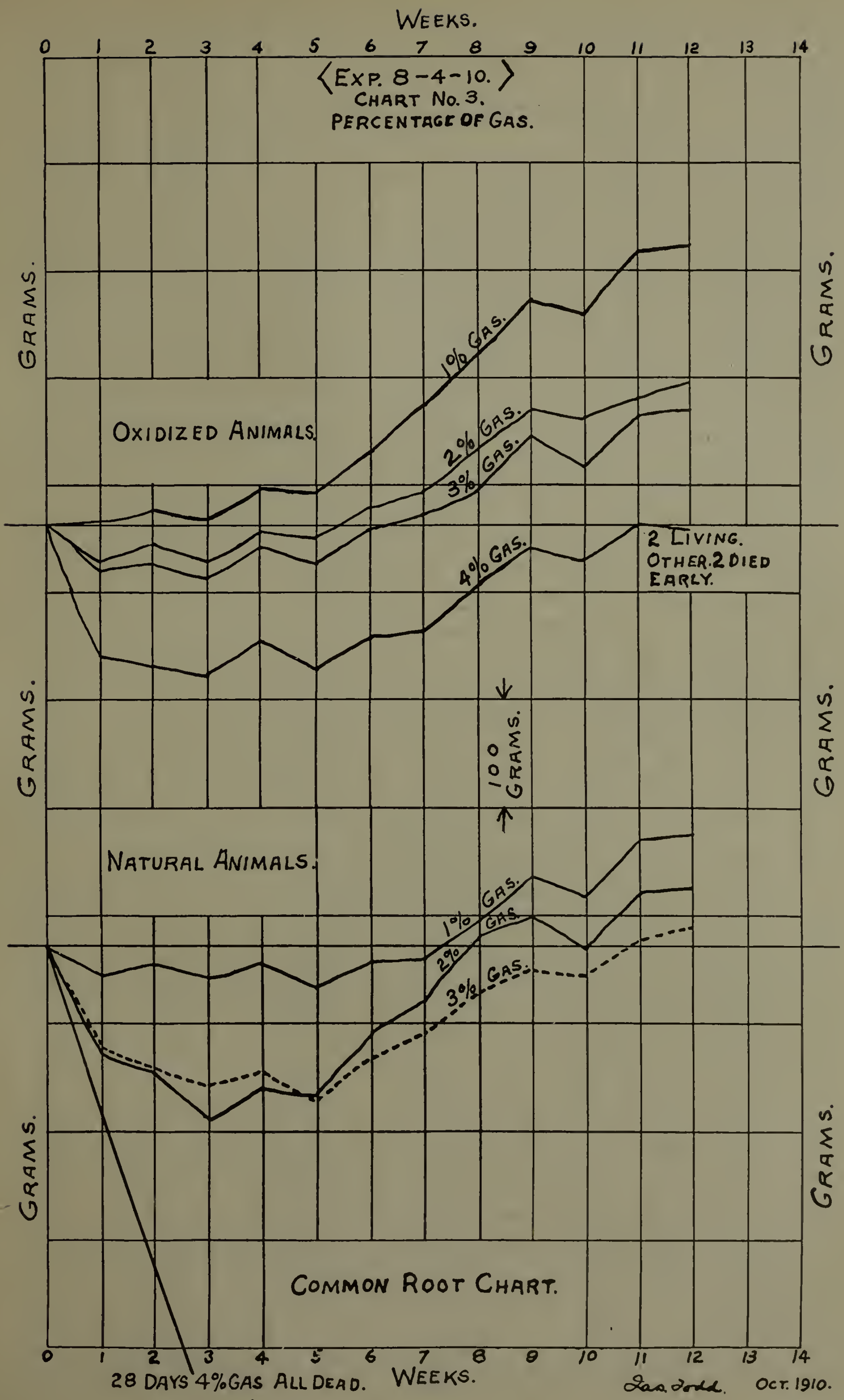
It would seem in looking at these curves, that oxygen had, through them, demonstrated its power in such a clear manner as not to require further discussion and we will pass on.

CHART NO. 3—PERCENTAGE OF GAS USED, page 31. On this drawing are placed the average curves of all the animals placed under the process, to demonstrate the changes due to different quantities of gas. It should be noted that all the natural animals placed in four per cent. of the gas died within four weeks and that one half of the previously oxidized ones also died.

Judged by our more than six years of work, we consider that two per cent. of the oxidizing gases, accurately and continuously mixed with the blast of pure air blown into the rooms, gives the best results, although heavily inoculated animals will stand three per cent. in perfect safety as far as death from the gas strain is concerned.

A heavily inoculated animal can stand much more gas than a lightly inoculated one, because he needs it more.

It requires great care to take these delicate little animals through the early stages of preliminary oxidation and we have lost many in this way, but one can take a heavily inoculated animal and plunge it into three or four per cent. of the gas and it never dies from the strain. This is well-matured information and is both interesting


WEEKS.
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
⟨EXP. 8-4-10.⟩
CHART No. 3.
PERCENTAGE OF GAS.
GRAMS.
GRAMS.
GRAMS.
GRAMS.
GRAMS.
GRAMS.
OXIDIZED ANIMALS.
1% GAS.
2% GAS.
3% GAS.
4% GAS.
2 LIVING. OTHER 2 DIED EARLY.
100 GRAMS.
NATURAL ANIMALS.
1% GAS.
2% GAS.
3% GAS.
COMMON ROOT CHART.
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
28 DAYS 4% GAS ALL DEAD.
WEEKS.
Jas. Todd.
OCT. 1910.

and conclusive of the value of the proper use of the proper form of oxygen in combating disease.

Chart no. 4, page 33. This is an exceedingly important drawing and brings, in strongest contrast, the principles we are demonstrating.

On the section of the drawing before inoculation, the section of preliminary oxidation, which is the making of an ⌖ animal for our purposes, we place, on the lower part of the drawing, the average weight changes of all the ⌖ animals prepared for the experiment and above this curve the one of the four animals oxidized, inoculated and carried forward in one per cent. of the oxidizing gases.

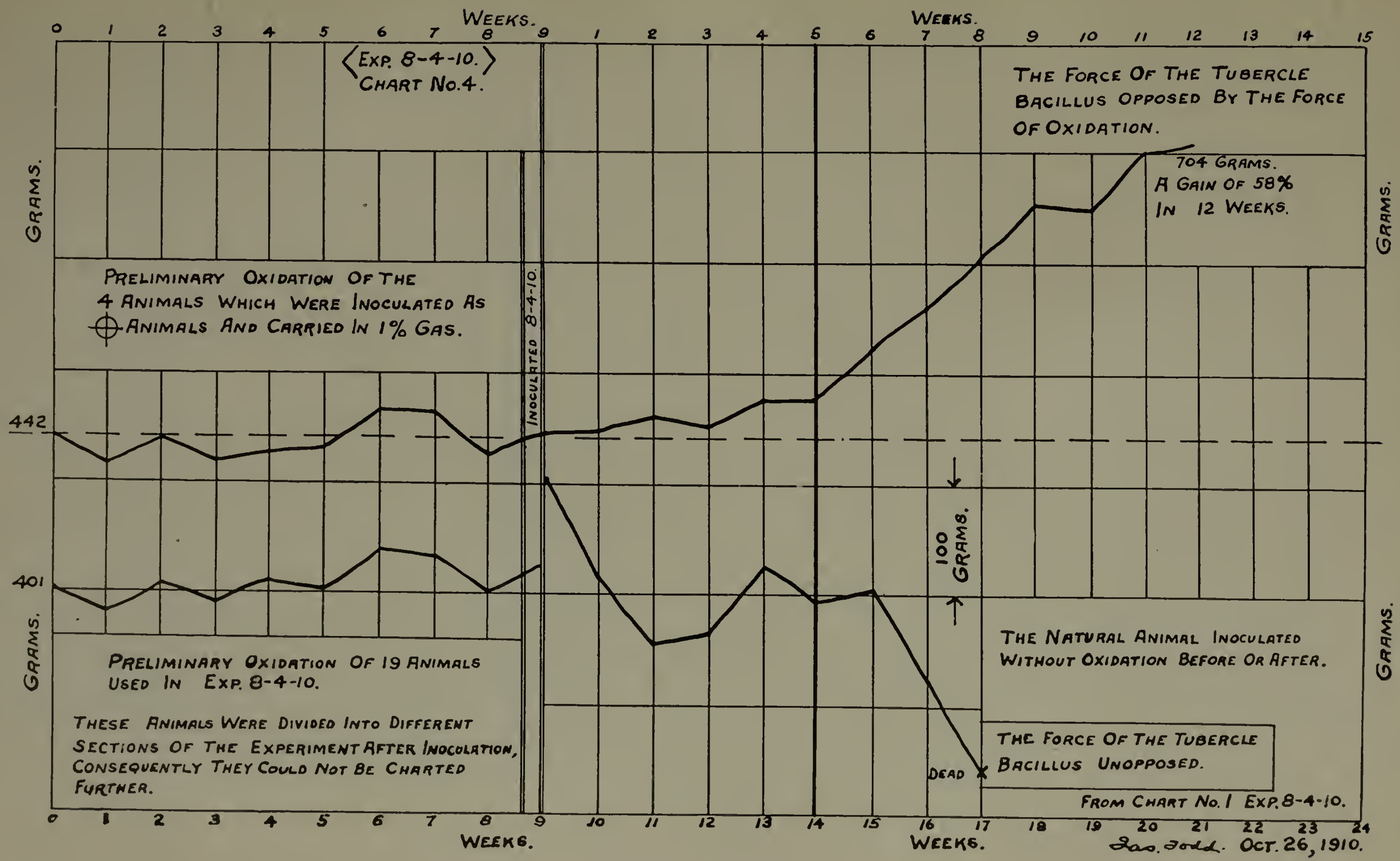
Note the almost identical character of the curves which well brings out the uniform action of the process and especially note that they all reach their apex at the sixth to seventh week. This loss of weight at about the seventh week of preliminary oxidation seems to be a distinct mark of the process, as it is always present, and will be dealt with more fully in its proper place.

After inoculation the seven check animals lose weight very heavily, then rally strongly and then plunge to their death as any guinea pig must which has been inoculated with virulent tubercle bacilli and not placed under the power of the proper form of oxygen.

The four animals shown in the upper line have been carefully prepared by preliminary oxidation and kept under the power of the oxygen after the inoculation; all, according to our views, that can be done for them has been done, and they are deliberately put to the test and what a result. *Let the oxygen speak for itself through the curves on the drawing.*

All the animals that were carried in three per cent. of the gas, as well as those still living from the four per cent. section of the experiment, were chloroformed and autopsies performed at the end of twelve weeks and no disease was found.

Of the remaining animals, namely those that had been carried


Weeks.
0 1 2 3 4 5 6 7 8 9
Weeks.
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Exp. 8-4-10.
Chart No. 4.
The Force Of The Tubercle Bacillus Opposed By The Force Of Oxidation.
704 Grams.
A Gain Of 58%
In 12 Weeks.
Grams.
Preliminary Oxidation Of The 4 Animals Which Were Inoculated As ⊕ Animals And Carried In 1% Gas.
Inoculated 8-4-10.
442
401
100 Grams.
Grams.
Preliminary Oxidation Of 19 Animals Used In Exp. 8-4-10.
These Animals Were Divided Into Different Sections Of The Experiment After Inocolation, Consequently They Could Not Be Charted Further.
The Natural Animal Inoculated Without Oxidation Before Or After.
The Force Of The Tubercle Bacillus Unopposed.
Dead
From Chart No. 1 Exp. 8-4-10.
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Weeks.
Weeks.
Jas. Todd. Oct. 26, 1910.

in one per cent. and in two per cent. of the gas, with the exception of one -⊖- animal in the two per cent. of gas section which died about two weeks after inoculation, all were placed in one per cent. of the gas at the fourteenth week and we will follow their history on CHART NO. 6, page 35. On this drawing the four sections dealt with are carried separately in order to allow of comparisons. The trend of the animals is all upwards.

On page 36 we place CHART NO. 7. On this one drawing is the whole history of this experiment so placed as to show every vital detail at a single glance. The drawing is divided into three sections. On the upper section is the weight curve of the nineteen animals cured, which are here consolidated into one average curve of the whole.

At inoculation they averaged five hundred and seventy-two grams, at the end of eight months nine hundred grams. At this point the treatment was discontinued and the animals kept in an outdoor cage under ordinary conditions to determine if the disease would return.

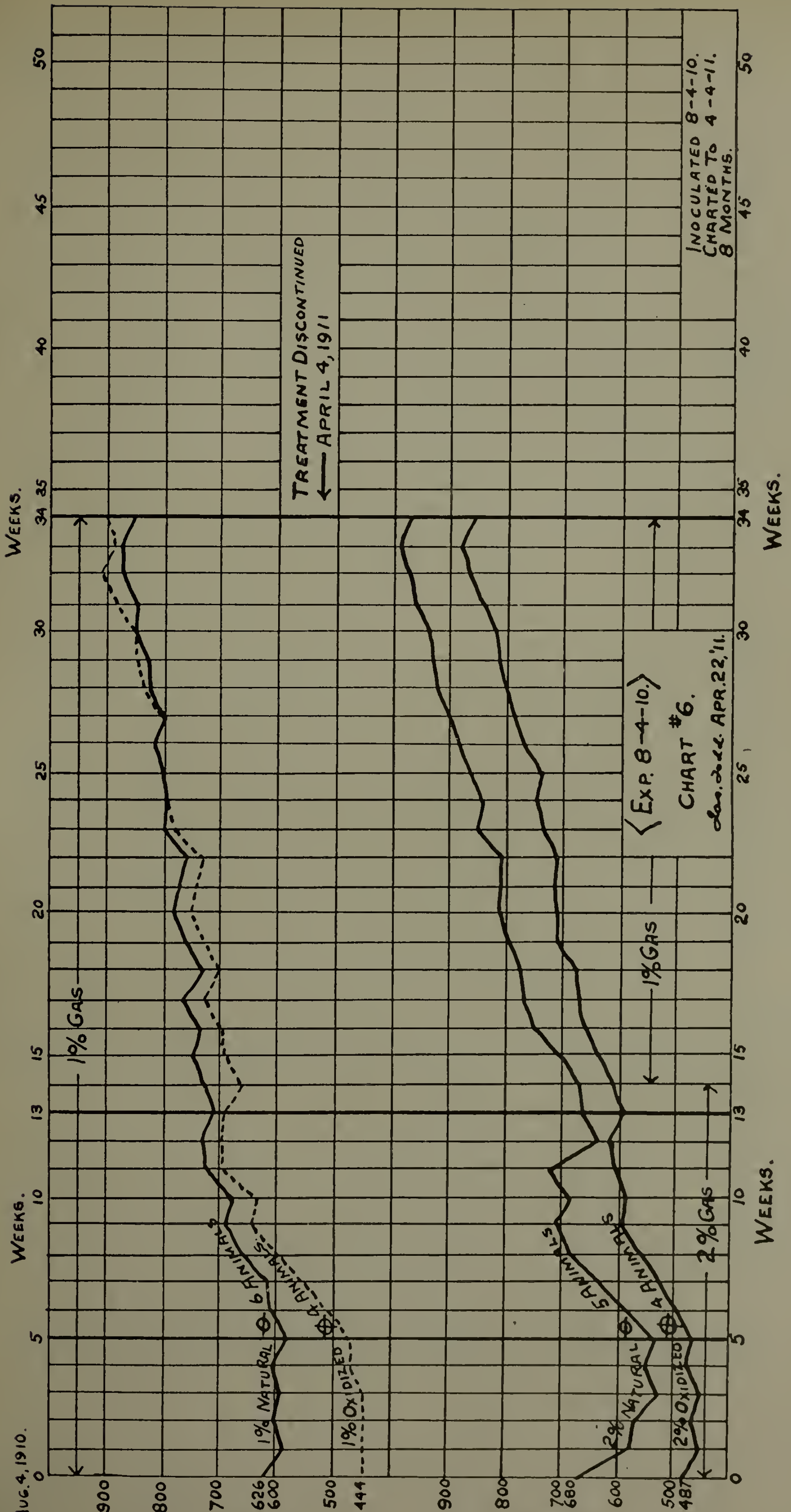
It is worth noting that the curve became much flatter after the treatment was discontinued, with practically no permanent increase in weight during this latter period of four months.

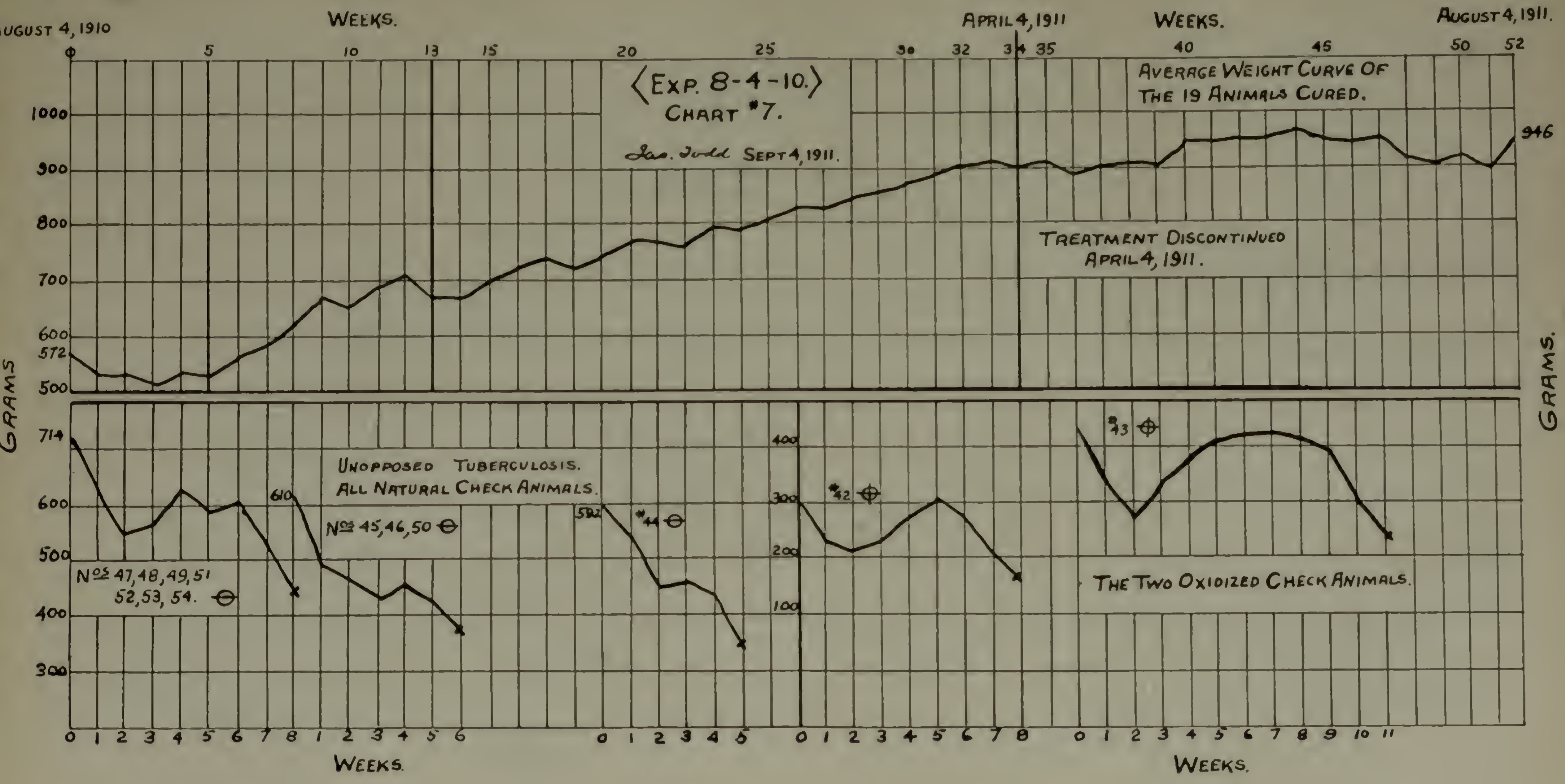
The average weight of the animals one year after their inoculation is another proof of their wonderful health; nine hundred and forty-six grams as the average weight of the nineteen animals proves them to be unusually large.

At the end of the year they were chloroformed and extensive autopsies performed, but no disease was found.

The lower left-hand section of the drawing carries the curves of the natural check animals and the right-hand lower section the two previously oxidized check animals.

From all sections of the experiment comes overwhelming evidence of the power of OXYGEN, and it will be well to realize the positive character of the arrayed proofs, as it is not the writer's intention, having delivered such indisputable facts, to argue about them;


Aug. 4, 1910.
Weeks.
Weeks.
Grams.
Grams.
0
5
10
13
15
20
25
30
34
35
40
45
50
900
800
700
626
600
500
444
900
800
700
680
600
500
487
1% Natural
6 Animals
1% Oxidized
4 Animals
1% Gas
2% Natural
5 Animals
2% Oxidized
4 Animals
2% Gas
1% Gas
Treatment Discontinued
April 4, 1911
⟨Exp. 8-4-10.⟩
Chart #6.
Las. Dell. Apr. 22, '11.
Inoculated 8-4-10.
Charted to 4-4-11.
8 Months.


⟨Exp. 8-4-10.⟩
Chart #7.
Jas. Todd Sept 4, 1911.
ugust 4, 1910
Weeks.
April 4, 1911
Weeks.
August 4, 1911.
0
5
10
13
15
20
25
30
32
34
35
40
45
50
52
Average Weight Curve of The 19 Animals Cured.
946
1000
900
800
700
600
572
500
Treatment Discontinued April 4, 1911.
Grams
Grams.
714
600
500
400
300
610
Unopposed Tuberculosis. All Natural Check Animals.
Nos 45, 46, 50 ⊖
Nos 47, 48, 49, 51 52, 53, 54. ⊖
592
#44 ⊖
400
300
200
100
#42 ⊕
#43 ⊕
The Two Oxidized Check Animals.
0 1 2 3 4 5 6 7 8 1 2 3 4 5 6
0 1 2 3 4 5
0 1 2 3 4 5 6 7 8
0 1 2 3 4 5 6 7 8 9 10 11
Weeks.
Weeks.

the distinction is between life and death, while the difference is that the tubercle bacillus has at last met his natural opponent.

We have spoken of the mistake made when the animals were inoculated and the resultant absence of tubercular organs in the check animals. We will take up this question of the cause of the death of the check animals by means of CHART NO. 8—CAUSE OF DEATH, page 38. On this drawing we have placed the weight curves of all the natural check animals used in this section of the animal work.

On the left side of the drawing we place the individual curves of each of the eleven natural check animals.

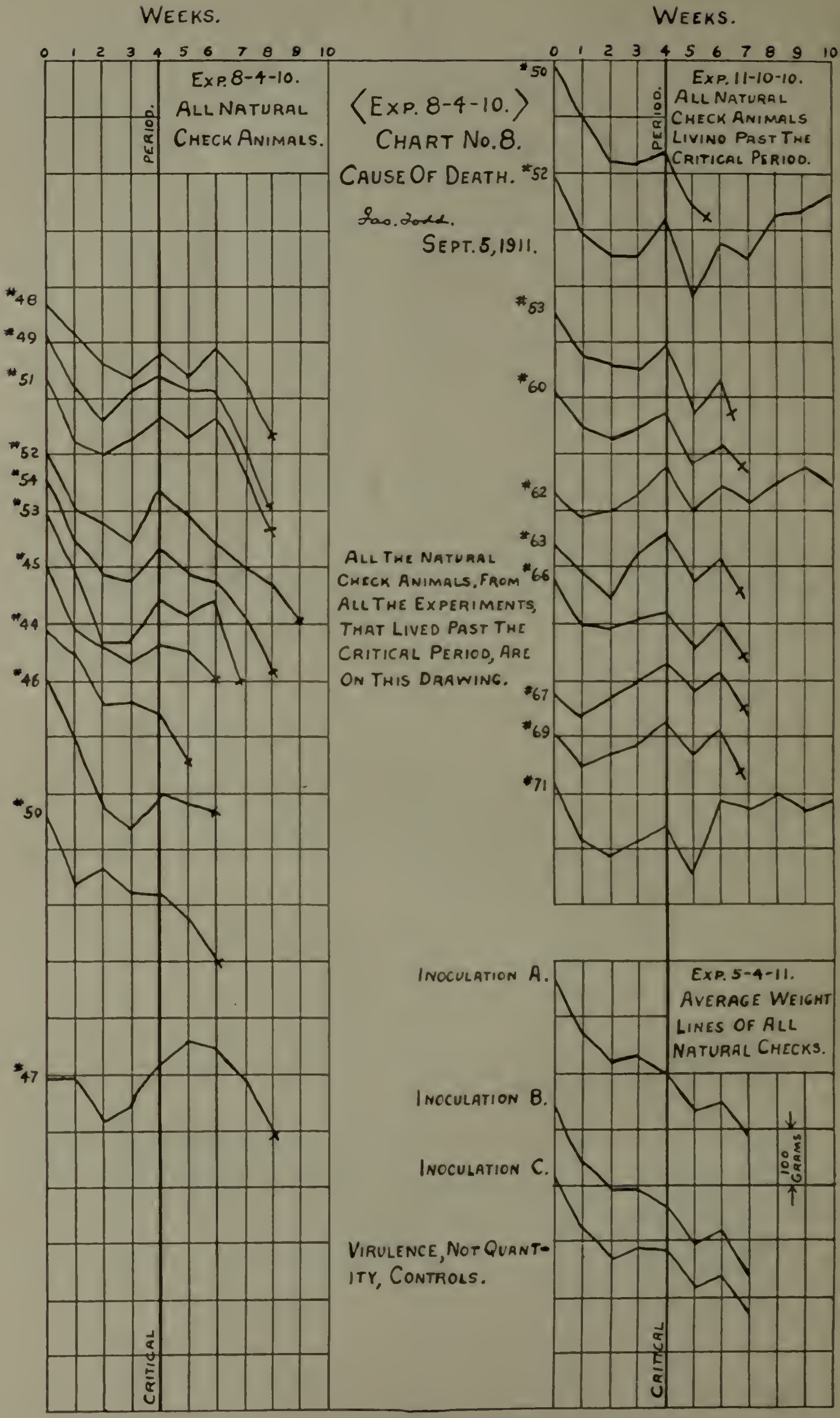
On the right upper section we place the curves of all the natural check animals from the November Experiment (EXPERIMENT 11–10–10) that lived past four weeks. Below these we place the average curves of each division of natural check animals from the First May Experiment (EXPERIMENT 5–4–11).

Please notice the heavy loss of weight at the fourth week in the check animals of the November Experiment, a terrific blow has been uniformly struck them at this period; the clearness, force and uniformity of the blow force it upon our attention; we call it the critical period in unopposed tuberculosis.

An examination of the curves of the First May Experiment (EXPERIMENT 5–4–11) just below show the same heavy decline at the same period as shown by average curves; there are thirty animals involved in the three curves of the natural check animals in this last experiment and each individual animal lost weight from the fourth to the fifth week.

All the check animals from these two experiments died with strongly tubercular organs, while the main character of their weight record was this blow at the critical period.

With this explanation of this peculiar phenomenon of the critical



⟨Exp. 8-4-10.⟩
Chart No. 8.
Cause Of Death.
Jas. Todd.
Sept. 5, 1911.

All The Natural Check Animals, From All The Experiments, That Lived Past The Critical Period, Are On This Drawing.

Virulence, Not Quantity, Controls.

period before us, we turn to the check animals of our present experiment and we find the blow at the fourth week plainly before us in ten of the eleven animals.

This is very interesting and is real evidence to the student of the process, *but the fact that is paramount to all else in the experiment is that all the animals were inoculated with the tubercle bacillus and that the check animals all died while nineteen out of twenty of those under the treatment lived.*

We will here leave the August Experiment to take up the complicated phenomena which gradually bring us face to face with the greatest material problem man has ever attempted to solve.

EXPERIMENT 11-10-10

THE NOVEMBER EXPERIMENT

The plan of this experiment, which grew naturally out of the results of the August Experiment, was to inoculate the animals heavily and oppose the disease with a minimum quantity of the oxidizing gases.

There are between sixty and seventy animals involved in the experiment.

They were all inoculated subcutaneously in the abdominal region, with five hundred million of the tubercle bacilli, the count being based on quantitative weights of the pure culture of the germs. Thus a very large number of germs were used and by placing them just under the skin of the animals we insured a fostering point for them to spread from.

The inoculation was opposed by one per cent. of the oxidizing gases mixed with ninety-nine per cent. of pure air. This was a great mistake and was one of the main causes why the experiment fell so far below the attainment of the previous ones.

After exposing the animals for three weeks to one per cent. of the oxidizing gases, we increased the quantity to two per cent., but the damage had already been done.

On page 42 we place CHART NO. 1—CHECK ANIMALS, EXPERIMENT 11-10-10. An examination of this drawing well demonstrates the strength and virulence of the inoculation and shows the peculiar critical period at the fourth week which we used in demonstrating the cause of the death of the check animals in the August Experiment.

We would particularly call attention to the violent changes shown by the weight curves of these animals and to the fact that less than half of them lived to pass the fourth week.

Turning now to CHART NO. 2—ANIMALS UNDER TREATMENT, on page 43, a glance shows that these animals lived longer than the check animals and that their curves are mainly free from the violent changes shown in the record of the check animals.

While more than one half of the check animals died before the fourth week, yet the first one to die under the treatment lived almost eight weeks.

Turning now to CHART NO. *2A*, page 44, we find still longer life culminating in animal No. 49 and the same placid character of the curves is maintained; there can be but one conclusion based upon these smooth, slowly changing curves as compared with the extremely violent changes of the check animals and that is that the animals in which the germ force was opposed by the force of intensified oxygen suffered less.

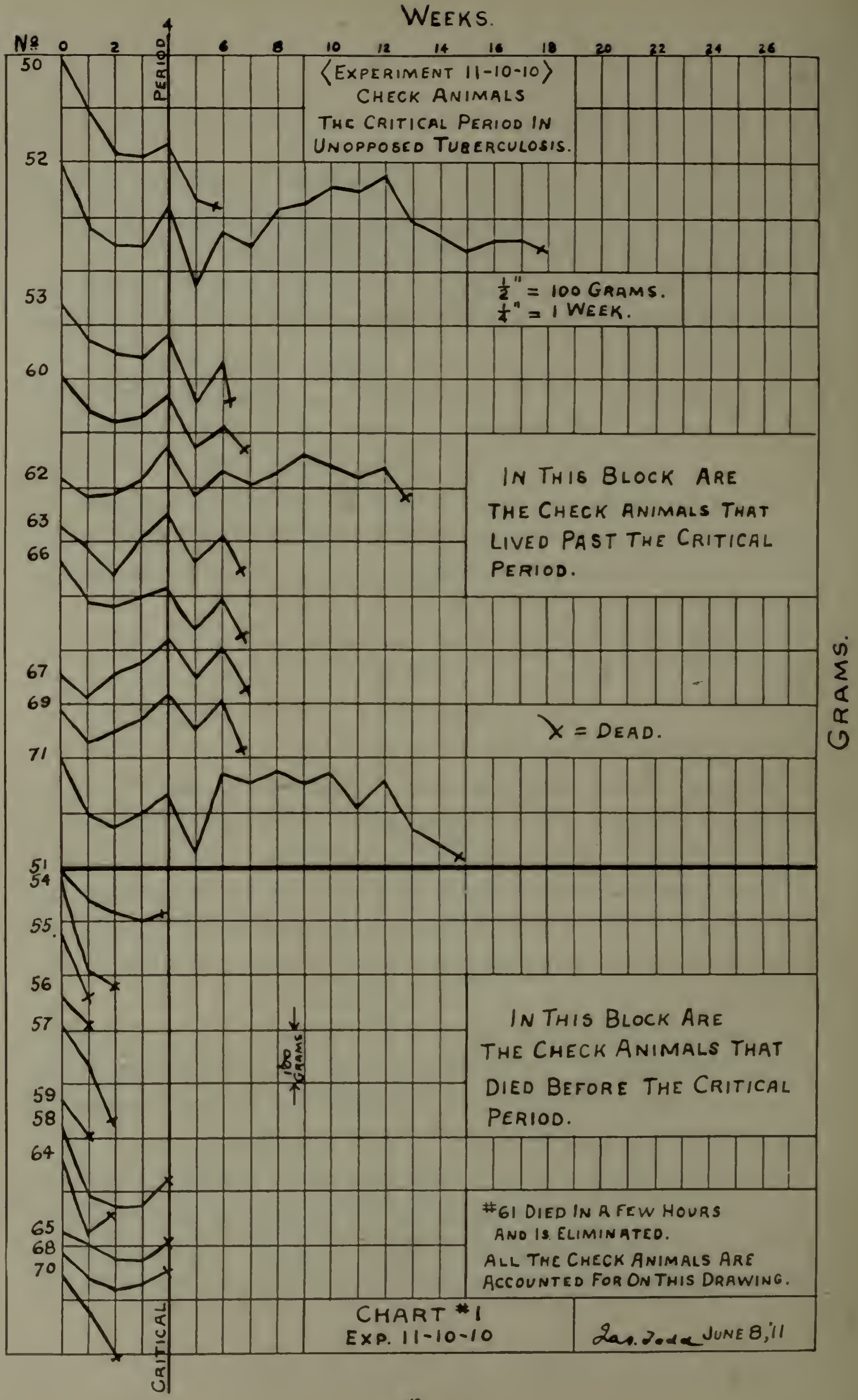
On this latter drawing are shown the curves of six females eliminated from the experiment; their pregnancy was discovered after their inoculation; we eliminated them from the work and in the future only inoculated male animals.

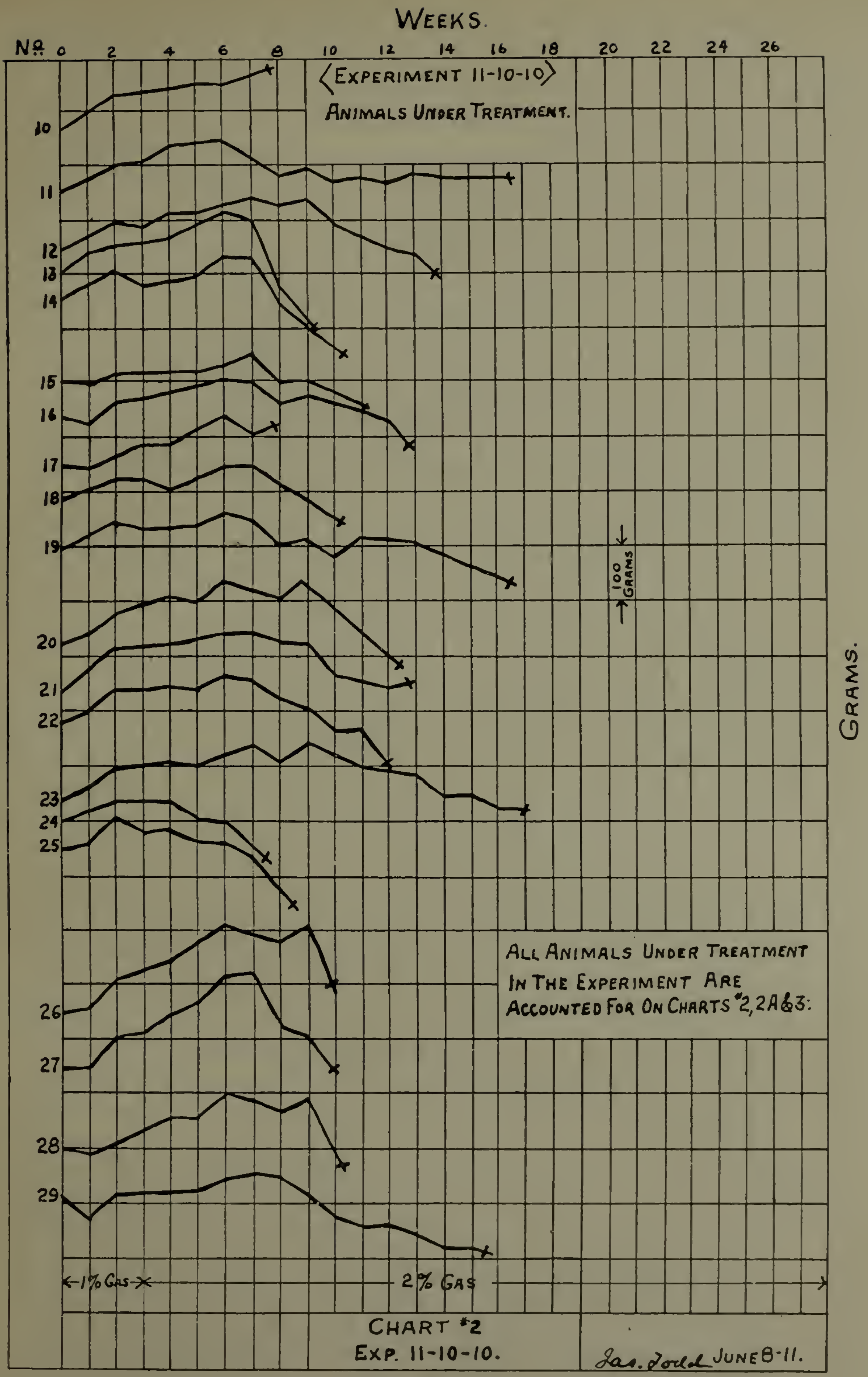
On page 45, we place the curve of animal No. 49. We ask a close examination of this animal's record as a demonstration of the power of oxygen, even when used as unintelligently as we here used it.

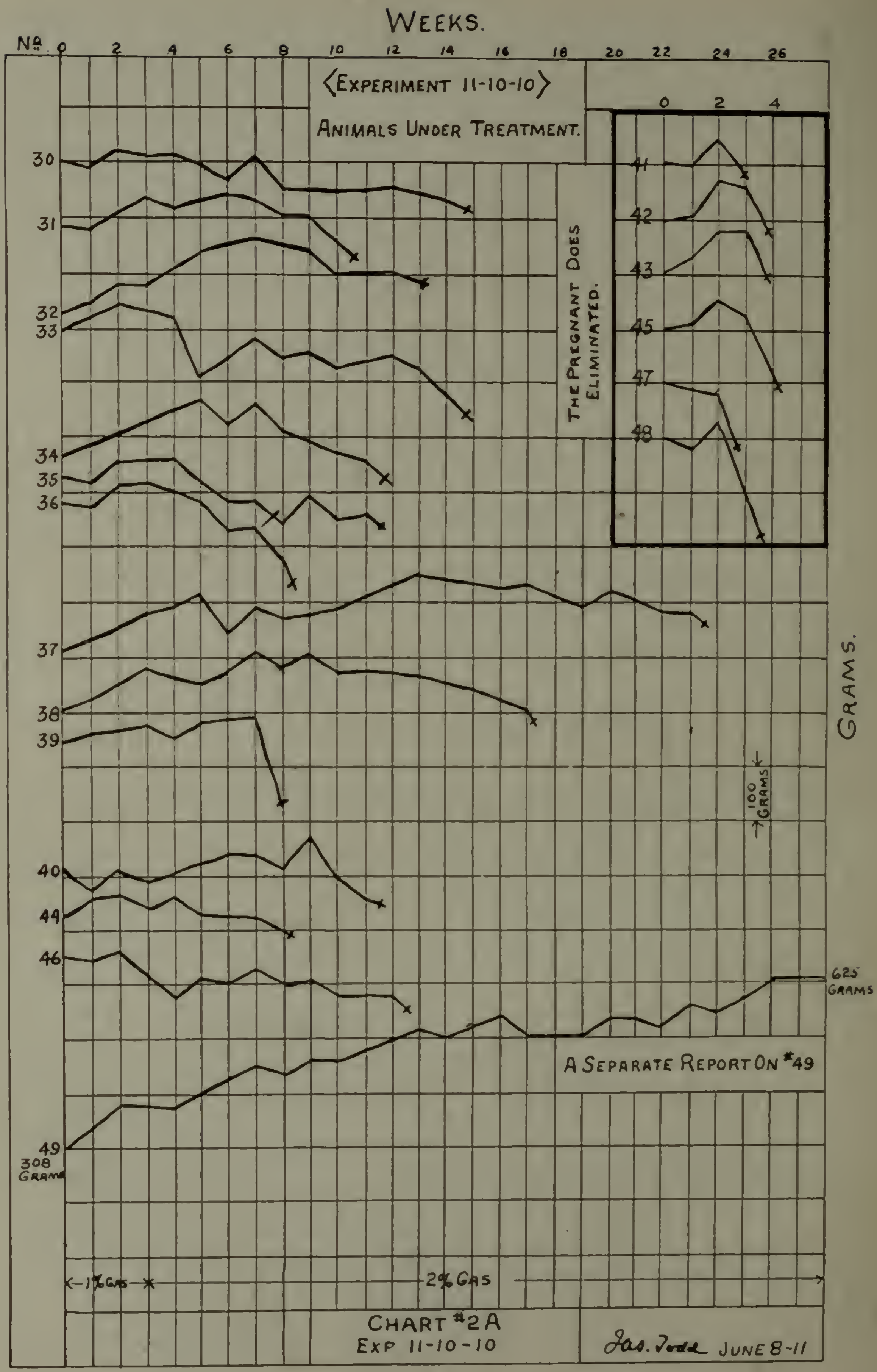
The animal moved smoothly forward in spite of the fact that five hundred millions of these dread germs had been placed in its little body; rising from a weight of three hundred and eight grams to above six hundred grams, and lived for almost a year.

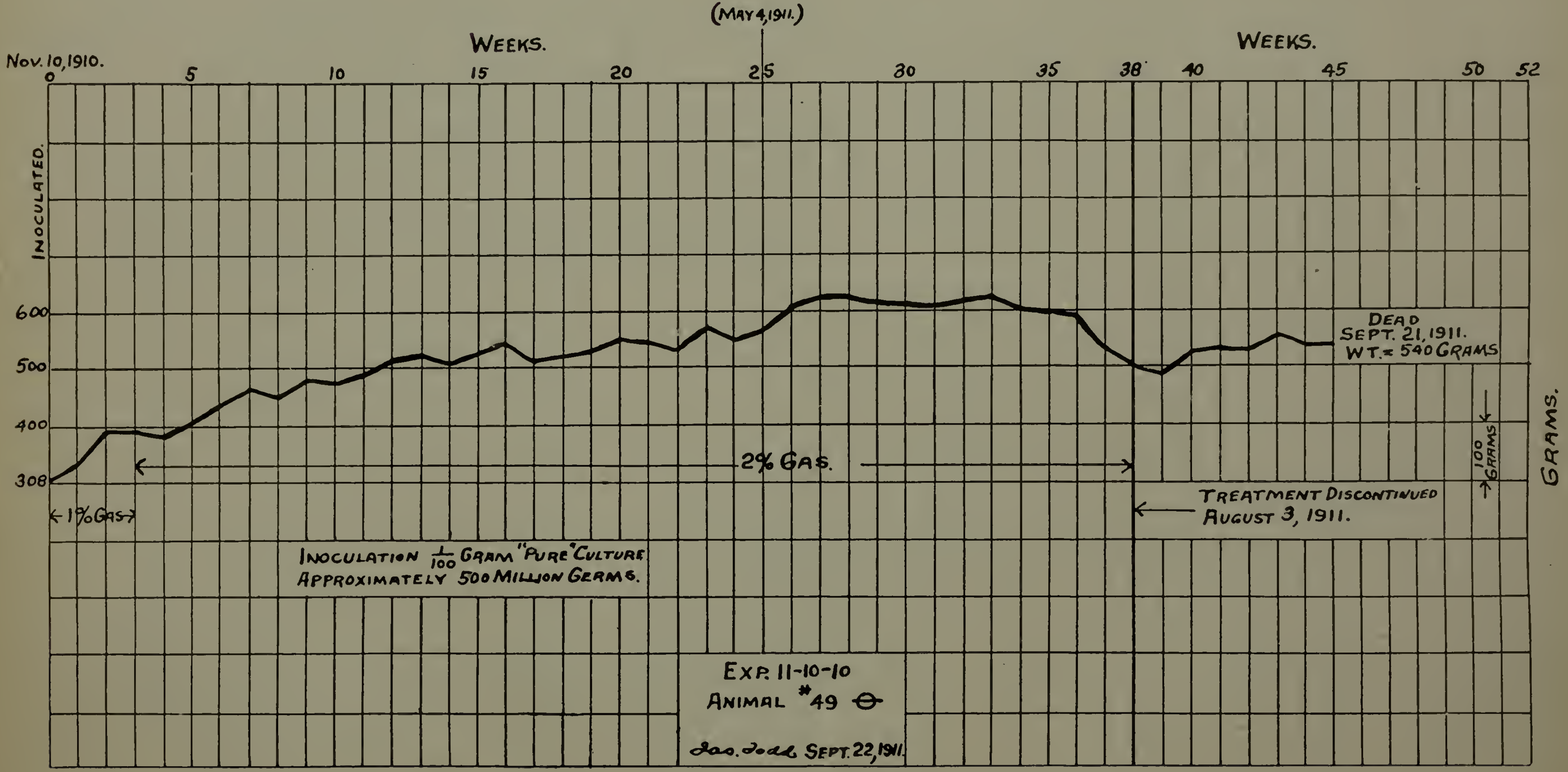
A process that can accomplish this in the face of the records made by the check animals must contain inherent power and when that process is applied to the strongest animal known, man, the record should be much better.

In leaving this animal's record it is worth noting that it lived certainly the greater portion of its natural span of life in spite of the hordes of the tubercle bacilli within its body. There were some evidences of tubercular healing found when its autopsy was performed.


WEEKS.
Nº
0
2
4
6
8
10
12
14
16
18
20
22
24
26
50
52
53
60
62
63
66
67
69
71
51
54
55
56
57
59
58
64
65
68
70
CRITICAL PERIOD
⟨EXPERIMENT 11-10-10⟩
CHECK ANIMALS
THE CRITICAL PERIOD IN
UNOPPOSED TUBERCULOSIS.
½" = 100 GRAMS.
¼" = 1 WEEK.
IN THIS BLOCK ARE THE CHECK ANIMALS THAT LIVED PAST THE CRITICAL PERIOD.
X = DEAD.
GRAMS.
100 GRAMS
IN THIS BLOCK ARE THE CHECK ANIMALS THAT DIED BEFORE THE CRITICAL PERIOD.
#61 DIED IN A FEW HOURS AND IS ELIMINATED.
ALL THE CHECK ANIMALS ARE ACCOUNTED FOR ON THIS DRAWING.
CHART #1
EXP. 11-10-10
Jas. Todd JUNE 8,'11


WEEKS.
No.
0
2
4
6
8
10
12
14
16
18
20
22
24
26
⟨EXPERIMENT 11-10-10⟩
ANIMALS UNDER TREATMENT.
10
11
12
13
14
15
16
17
18
19
100 GRAMS
20
21
22
23
24
25
GRAMS.
ALL ANIMALS UNDER TREATMENT
IN THE EXPERIMENT ARE
ACCOUNTED FOR ON CHARTS *2, 2A & 3:
26
27
28
29
←1% GAS→
2% GAS
CHART *2
EXP. 11-10-10.
Jas. Todd JUNE 8-11.


WEEKS.
No. 0 2 4 6 8 10 12 14 16 18 20 22 24 26
⟨EXPERIMENT 11-10-10⟩
ANIMALS UNDER TREATMENT.
30
31
32
33
34
35
36
37
38
39
40
44
46
49
308 GRAMS
THE PREGNANT DOES ELIMINATED.
0 2 4
41
42
43
45
47
48
GRAMS.
100 GRAMS
625 GRAMS
A SEPARATE REPORT ON #49
←1% GAS—×—2% GAS→
CHART #2A
EXP 11-10-10
Jas. Todd JUNE 8-11


(May 4, 1911.)
Weeks.
Weeks.
Nov. 10, 1910.
0
5
10
15
20
25
30
35
38
40
45
50
52
Inoculated.
600
500
400
308
Dead
Sept. 21, 1911.
Wt. = 540 Grams
2% Gas.
← 1% Gas →
100 Grams
Grams.
Treatment Discontinued
August 3, 1911.
Inoculation $\frac{1}{100}$ Gram "Pure" Culture
Approximately 500 Million Germs.
Exp. 11-10-10
Animal #49 ⊖
Jas. Todd Sept. 22, 1911.

On page 47, we place CHART NO. 1—AUTOPSIES OF CHECK ANIMALS.

These autopsy charts are particularly interesting in that they show the animals arranged in the order in which they died, with the length of their lives shown by the length of the life line of each, and also in that they so well show the period of time necessary to involve the different organs. For instance, the spleen and liver are very rarely attacked until a month or more has passed and the lungs still later and frequently not at all.

On page 48, we place CHART NO. 2—AUTOPSIES OF ANIMALS UNDER TREATMENT. It will be noted that the weight lost by these animals before death is, as a rule, much less than in the case of the check animals.

The writer considers it to be his duty to tell the full truth, as he sees it, in regard to these experiments. No attempt must be made to draw conclusions in favor of the process which common sense may not sustain, and no factor must be concealed. In his opinion, the great difference between the results of this experiment and the two that preceded it cannot properly be fully accounted for on the ground of a very heavy inoculation opposed by too small a quantity of the oxidizing gases. While it is true that this was a factor, yet in our judgment it was but a contributing one.

There is something radically wrong—*the vital force of the process is missing.*

It would probably not be interesting to follow us in detail through the five years of investigation, toil and anxiety that commenced at this stage of the work, and so we will instead try to give the vital facts as they developed, leaving the details for our own records.

In common justice to ourselves we would ask the reader to appreciate, at its full significance, the fact that we are dealing with an invisible gas and that there is no reagent yet known to man that can divide one form from another, for we intend to prove by using tuber-

WEEKS.

0 4 8 12 16 20 24 28 32 36 40 44 48 52

No.	GLANDS NEAR INOCULATION POINT.	GLANDS GENERAL	SPLEEN	LIVER	KIDNEYS	LUNGS	HEART	BRAIN	CHANGE IN WEIGHT	CONDITION OF BODY.
64	→xxx	0	0	0	0	0	0		−173	M
54	→xxx	0	0	0	0	0	0		−190	M
55	→xxx	0	0	xxx	0	0	0		−166	M
56	→xx	0	0	x	0	0	0		−129	M
57	→xxx	0	0	0	0	0	0		−174	M
59	→xxx	0	0	xx	0	0	0		−133	M
70	→xxx	0	0	0	0	0	0		−168	M
51	xxx	→xxx	xx	0	0	0	0		−64	M
58	xxx	→xxx	xx	0	0	0	0		−190	M
65	xxx	→xxx	xx	0	0	0	0		−30	M
68	xxx	→xx	0	0	0	0	0		−45	M
50	xxx	xxx→	xx	x	0	0	0		−274	M
53	xxx	xxx→	xx	xx	0	x	0		−195	M
60	xx	xxx→	xx	xxx	0	xx	0		−149	M
63	xxx	xxx→	xx	x	0	0	0		−82	M
66	xxx	xxx→	xx	xxx	0	0	0		−152	M
67	xxx	xx→	xx	0	0	0	0		−47	M
69	xxx	xxx→	0	0	0	x	0		−45	M
62	xxx	xxx	xx	→xx	0	xx	0		−48	M
71	xxx	xxx	xx	xxx→	0	x	0		−300	M
52	x	xxx	x	xx	→0	x	0		−140	M

→ LIFE LINE ⅛" TO ONE WEEK

X = ORGAN INVOLVED

XX = ORGAN LARGELY INVOLVED

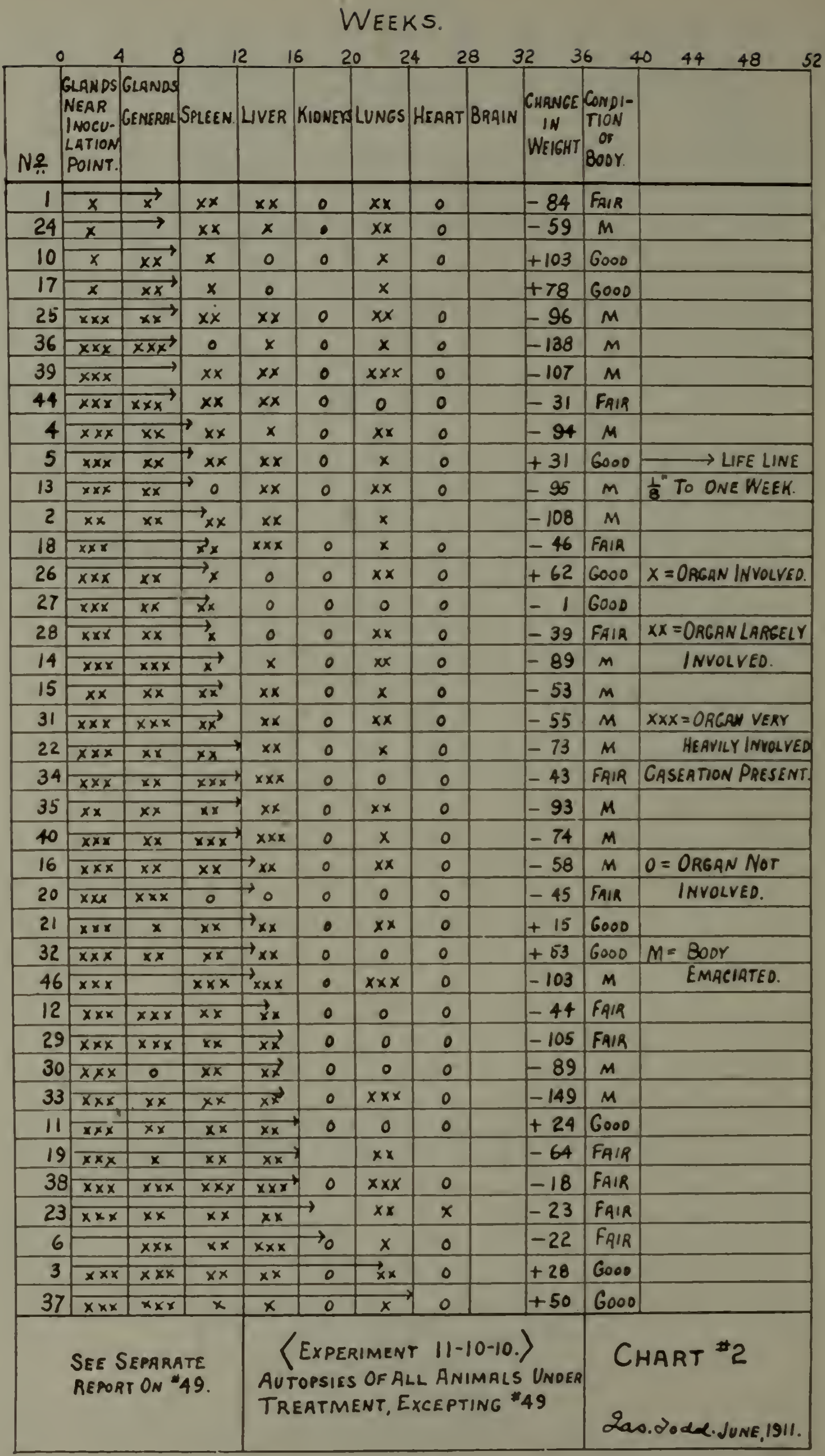
XXX = ORGAN VERY HEAVILY INVOLVED CASEATION PRESENT.

0 = ORGAN NOT INVOLVED.

M = BODY EMACIATED.

ALL CHECK ANIMALS ARE ON THIS DRAWING

⟨EXPERIMENT 11-10-10.⟩
AUTOPSIES OF CHECK ANIMALS
CHART #1
Jas. Todd JUNE, 1911.



Nº	Glands Near Inoculation Point.	Glands General	Spleen.	Liver	Kidneys	Lungs	Heart	Brain	Change in Weight	Condition of Body.
1	x	x	xx	xx	0	xx	0		− 84	Fair
24	x		xx	x	0	xx	0		− 59	M
10	x	xx	x	0	0	x	0		+103	Good
17	x	xx	x	0		x			+78	Good
25	xxx	xx	xx	xx	0	xx	0		− 96	M
36	xxx	xxx	0	x	0	x	0		−138	M
39	xxx		xx	xx	0	xxx	0		−107	M
44	xxx	xxx	xx	xx	0	0	0		− 31	Fair
4	xxx	xx	xx	x	0	xx	0		− 94	M
5	xxx	xx	xx	xx	0	x	0		+ 31	Good
13	xxx	xx	0	xx	0	xx	0		− 95	M
2	xx	xx	xx	xx		x			−108	M
18	xxx		xx	xxx	0	x	0		− 46	Fair
26	xxx	xx	x	0	0	xx	0		+ 62	Good
27	xxx	xx	xx	0	0	0	0		− 1	Good
28	xxx	xx	x	0	0	xx	0		− 39	Fair
14	xxx	xxx	x	x	0	xx	0		− 89	M
15	xx	xx	xx	xx	0	x	0		− 53	M
31	xxx	xxx	xx	xx	0	xx	0		− 55	M
22	xxx	xx	xx	xx	0	x	0		− 73	M
34	xxx	xx	xxx	xxx	0	0	0		− 43	Fair
35	xx	xx	xx	xx	0	xx	0		− 93	M
40	xxx	xx	xxx	xxx	0	x	0		− 74	M
16	xxx	xx	xx	xx	0	xx	0		− 58	M
20	xxx	xxx	0	0	0	0	0		− 45	Fair
21	xxx	x	xx	xx	0	xx	0		+ 15	Good
32	xxx	xx	xx	xx	0	0	0		+ 53	Good
46	xxx		xxx	xxx	0	xxx	0		−103	M
12	xxx	xxx	xx	xx	0	0	0		− 44	Fair
29	xxx	xxx	xx	xx	0	0	0		−105	Fair
30	xxx	0	xx	xx	0	0	0		− 89	M
33	xxx	xx	xx	xx	0	xxx	0		−149	M
11	xxx	xx	xx	xx	0	0	0		+ 24	Good
19	xxx	x	xx	xx		xx			− 64	Fair
38	xxx	xxx	xxx	xxx	0	xxx	0		−18	Fair
23	xxx	xx	xx	xx		xx	x		− 23	Fair
6		xxx	xx	xxx	0	x	0		−22	Fair
3	xxx	xxx	xx	xx	0	xx	0		+ 28	Good
37	xxx	xxx	x	x	0	x	0		+50	Good

⟶ Life Line
$\frac{1}{8}$" To One Week.

X = Organ Involved.

XX = Organ Largely Involved.

XXX = Organ Very Heavily Involved Caseation Present.

0 = Organ Not Involved.

M = Body Emaciated.

See Separate Report On #49.

⟨Experiment 11-10-10.⟩
Autopsies Of All Animals Under Treatment, Excepting #49

Chart #2

Jas. Todd. June, 1911.

culosis and other diseases, for the study of so-called ozone, that the element OXYGEN can and does take many different forms; that some of these forms, even of the intensified kind, have little or no effect on disease, while other forms create a strong, definite resistance and that there exist still other classes or forms of oxygen that can raise the vital forces of the living body so strongly as to rob these dread diseases of their terrors for us.

In the end we do not solve the problem, as we have not the resources necessary to its complete mastery, but we do so circumscribe and develop it as to place its full solution within reach of the world, if the world so chooses.

We would also here state that we do not conceive that we are trying to cure tuberculosis by means of oxygen, *we are rather trying to raise the vital forces of the living body by means of certain forms of intensified oxygen so as to enable that body to master its own problems. We do not attempt to reach tuberculosis; we rather attempt to reach and fortify the living body, knowing that it can then reach and master its own problems far better than we could do.*

The breadth of our work will be found to sustain our claims but please note that while recognizing the breadth of the principles we deal with, yet that we do not claim that their application is universal.

To commence with our problem, a close investigation established the fact that the operation of our machinery for the "ozonizing" of the air had changed.

The square glass plates used between the various terminals for treating the air in converting a portion of it into so-called ozonized air would no longer stand the strain and we could only carry 5,900 volts in the machine where previously we carried 6,600.

For more than two years we changed and studied our machinery operations before discovering the cause and by that time found that our problem consisted not of simply returning to the proper voltage, but rather to a number of factors, all of which had to be brought into harmony.

The different factors will be dealt with as they occurred and in the final summing up we will gather them all together in a separate chapter.

Many months were given to the study of and preparation for the experiment we will next take up, and a year and a half to its execution.

THE INVESTIGATION PRECEDING THE FIRST MAY EXPERIMENT

Until this time we had paid very little attention to the operation of our machinery so long as it made a comparatively uniform supply of so-called ozonized air, as we had had no conception past the use of so-called ozone as an intensified form of oxygen; but now all had to be changed as we found that for some unknown reason the trend of our work had lowered.

The investigation started in the fall of 1910 has gone on unceasingly to the present time, a period of five years.

For long it was a vague groping in the dark, for our gas is invisible and there are, as yet, no known reagents to divide one form from another.

The main hope held out by the continuance of the work was the fact that if our experiments were, in the main, well designed and their results wisely interpreted, the work would in time show its own trend.

This has really proved to be the case, as in looking back over its course it becomes a study of tuberculosis by means of so-called ozone and a study of the different gases by means of their effect on tuberculosis.

The final result has been clear and conclusive and may as well be told here as later.

The conclusion we draw from the mass of the work is that instead of having one form of intensified oxygen to deal with, we have many, and that there is more than one factor in mechanical operations that affects the result. It seems as if the path was a very narrow one for any change in any chemical, mechanical or electrical factor seems to change the result. A change in voltage, a change in the character of the insulators used, temperature, humidity of the air, the speed of its passage, all strongly affect the result and these are but the beginnings.

The reader will appreciate, if he is skilled in chemistry, *the tremendous import of a result which goes far to establish as a fact that oxygen can and does take many forms, thus establishing the element as capable of change.*

With our final conclusions thus outlined, we will turn to the engine room where the work now centers.

We find in the engine room the following machinery:

A small dynamo specially wound for the purpose of making "ozone."

This dynamo operates at 100 volts with a very small amperage.

An ordinary transformer stepping up the current by the multiple 66.

An ozone generator of an obsolete type, composed of four cells through which the air passes.

Each cell is composed of thirty-two corrugated aluminum "mattresses" six inches square; between each mattress is a glass plate eight inches square and one eighth of an inch thick.

Terminal wires run from the dynamo through the proper circuit to each mattress.

The "ozone" cells are cased in slate boxes and the air passes upwards through the mattresses, thus coming into contact with the electric current.

The four generating cells were enclosed within a very poorly designed and constructed cast-iron case.

Later it was demonstrated that the poor construction of this casing led to a leakage of air through its defective joints, amounting in round figures to fifty per cent. Untreated air was thus mixed with that which had been ozonized immediately after its "ozonization."

The air was made to flow through the "ozonizers" by a small Root blower which up to this time had drawn the air through.

The rest of the engine room equipment, consisting of the necessary steam engine to drive the whole apparatus, a large Root blower to supply the pure air used in the animal rooms to dilute the "ozonized air," switchboards, voltmeters, shafting, etc., do not enter into the problem and so require no description.

The air was drawn by the blower through the "ozonizers" and was then, after passing through the blower, forced to the animal rooms through brass pipes, a distance of about one hundred feet, there to be mixed in measured quantities with the pure air coming from the other blower.

Nitric acid resulting from the formation of nitrogen peroxide during the process of "ozonizing" the air had been present during the first two experiments to such an extent as to cause us to place drip pipes in the lines to draw it off and thus save our piping.

Nitrogen peroxide was not present during the November Experiment, which fact created what we call the nitrogen problem—the question of whether nitrogen was an essential of the process.

This phase of the problem is dealt with later at great length by means of the Nitrogen Experiment.

The pipes from the engine room to the animal rooms were found heavily coated on the inside with oxide of iron, caused by the "ozonized air" corroding the cast-iron case and impellers of the blower, and the red oxide of iron thus formed was forced through the whole system of piping. Wherever collected from the pipes, this red oxide of iron, when heated in a test tube, gave off the orange-colored fumes of peroxide of nitrogen, thus showing it to be saturated with nitrogen compounds.

In the CHEMICAL AND MECHANICAL SECTION we show by experiment the apparent catalytic effect of iron oxide on "ozone," it having the power of destroying the gases by contact with them, without undergoing any apparent change itself, and so the element iron becomes a factor in our problem as it absorbs nitrogen peroxide and destroys "ozone."

The most apparent factor that the investigation developed was the fact that in the first two experiments our "ozonizers" were operated with 100 volts on the dynamo and 6,600 on the generating cells, while now we could barely attain 90 volts on the dynamo and consequently less than 6,000 on the cells.

The glass plates separating the mattresses broke down if we tried to raise the voltage and even at 6,000 volts broke very frequently.

This seemed to be the most evident change in operations and we bent all our energies to its correction, but it took almost two years before the problem was solved and we could carry our full force on the "ozonizers," so we of necessity started into our next experiment running ten per cent. low in voltage.

We decided to eliminate the effect of iron from the work and constructed an entirely new "ozone" generator, strongly and well built of cast iron, but with all the inside of the casing and the pipes leading from it enamelled with a vitreous enamel burned on, such as is used on bathtubs.

We then placed the Root blower so as to *force* the air through the generating cells, so that after it was "ozonized" it did not come into contact with iron.

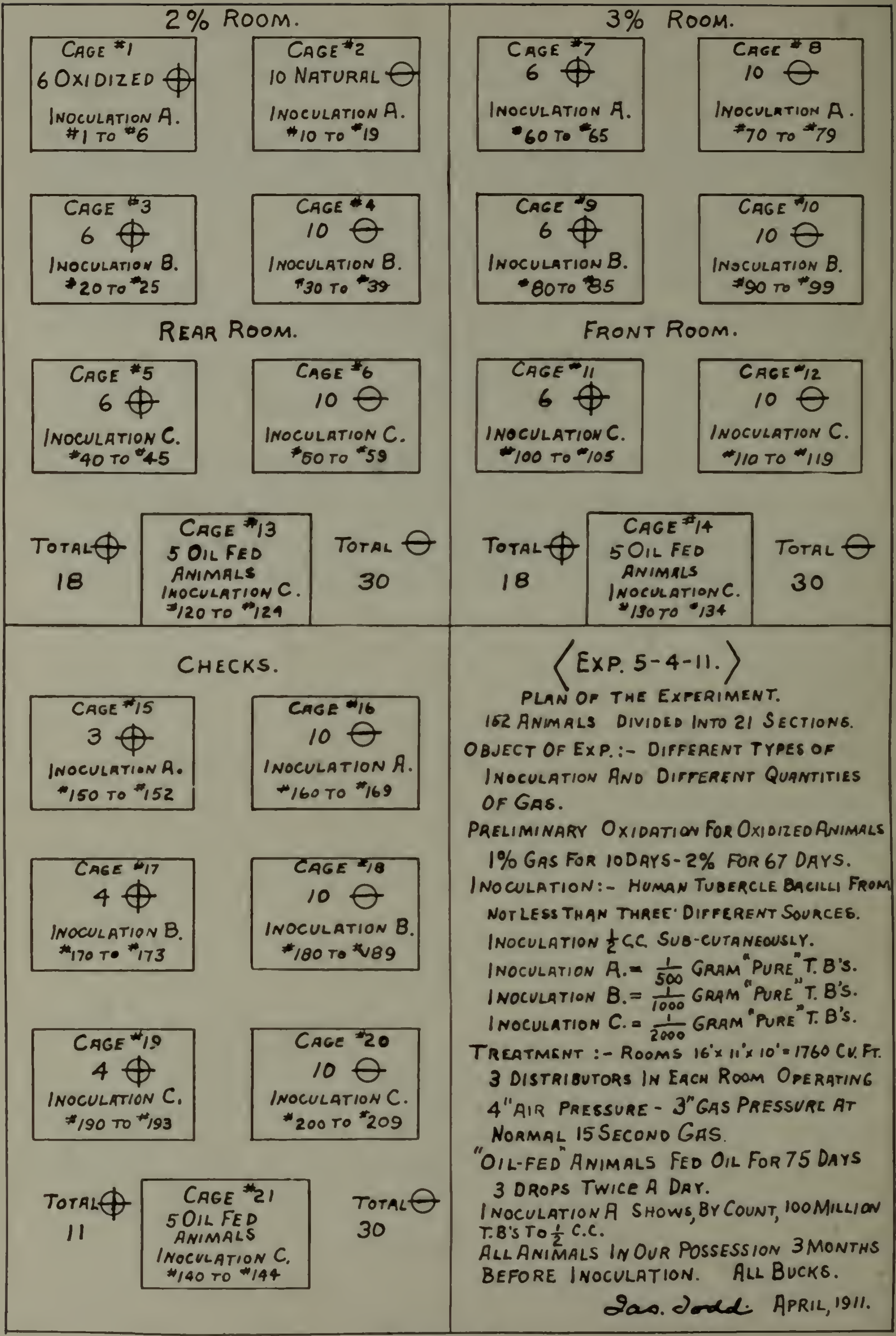
At the low voltage we were forced to use, we had no compounds of nitrogen present and so we passed to our experiment with nitrogen compounds eliminated, iron eliminated and operating ten per cent. low on voltage.

At the same time we concluded to consider the quantity of air and "ozonized air" which passed through the rooms in a given time. To accomplish this we adopted the rule of using one distributor for each five hundred cubic feet of room capacity. (The distributor is shown in detail in the last section of the book.)

This consideration of and heavy increase in the quantity of air and oxidizing gases passing through the animal rooms in a given time seems to have been an important step forwards.

Our reasoning is that intensified oxygen is very fragile and requires to be used quickly.

With this necessarily long explanation of our surroundings as affecting our work, we will take up the largest and most comprehensive of the experiments, realizing that its very size requires great care and system to prevent the results from becoming too involved.



EXPERIMENT 5-4-11

THE FIRST MAY EXPERIMENT

On page 56 we place CHART NO. 1—The Plan of the Experiment.

By a study of this plan it is found that we have one hundred and fifty-two animals divided into twenty-one sections; that we are handling both the oxidized and the natural animal in large numbers involving three different strengths of inoculation *A*, *B* and *C* and two different strengths of gas, two per cent. and three per cent. All the details are on the plan and should be thoroughly noted, as the experiment is so large as to tend to become involved in one's mind if its plan is not thoroughly understood at the start.

There are twenty-three drawings used as a basis for our reasoning and the full history of each animal is given in detail and of all the animals there is not a single elimination.

It will be noticed that the plan carries in each of its main sections five animals marked as "oil fed." These records are to be set aside so far as this experiment is concerned as they properly belong to the Nutritive Oxidation Section of the work, where they will be taken up in detail.

On account of the general plan and detail of the drawings, we can proceed very rapidly to the consideration of the results of the experiment which are very clear and conclusive.

We will take up the check animals first, starting with CHART NO. 2, page 59.

On the left side of the drawing are three previously oxidized, ⊕, check animals, while on the right are ten natural, ⊖, check animals.

All these animals were inoculated with the "*A*" inoculation, consisting of one hundred millions of germs to each animal.

A single glance at the two columns of weight curves shows that the ⊕ did not lose weight as rapidly as the natural, or ⊖, ones.

Again is brought into prominence the greater strength of the oxidized animal, demonstrated even where it is used as a check animal to which no intensified oxygen is given after inoculation. Such a distinction as this means real inherent strength of the animal due to the process.

Notice the virulence, or power, of the inoculation we must fight as demonstrated by the heavy weight loss in the natural check animals and their short life.

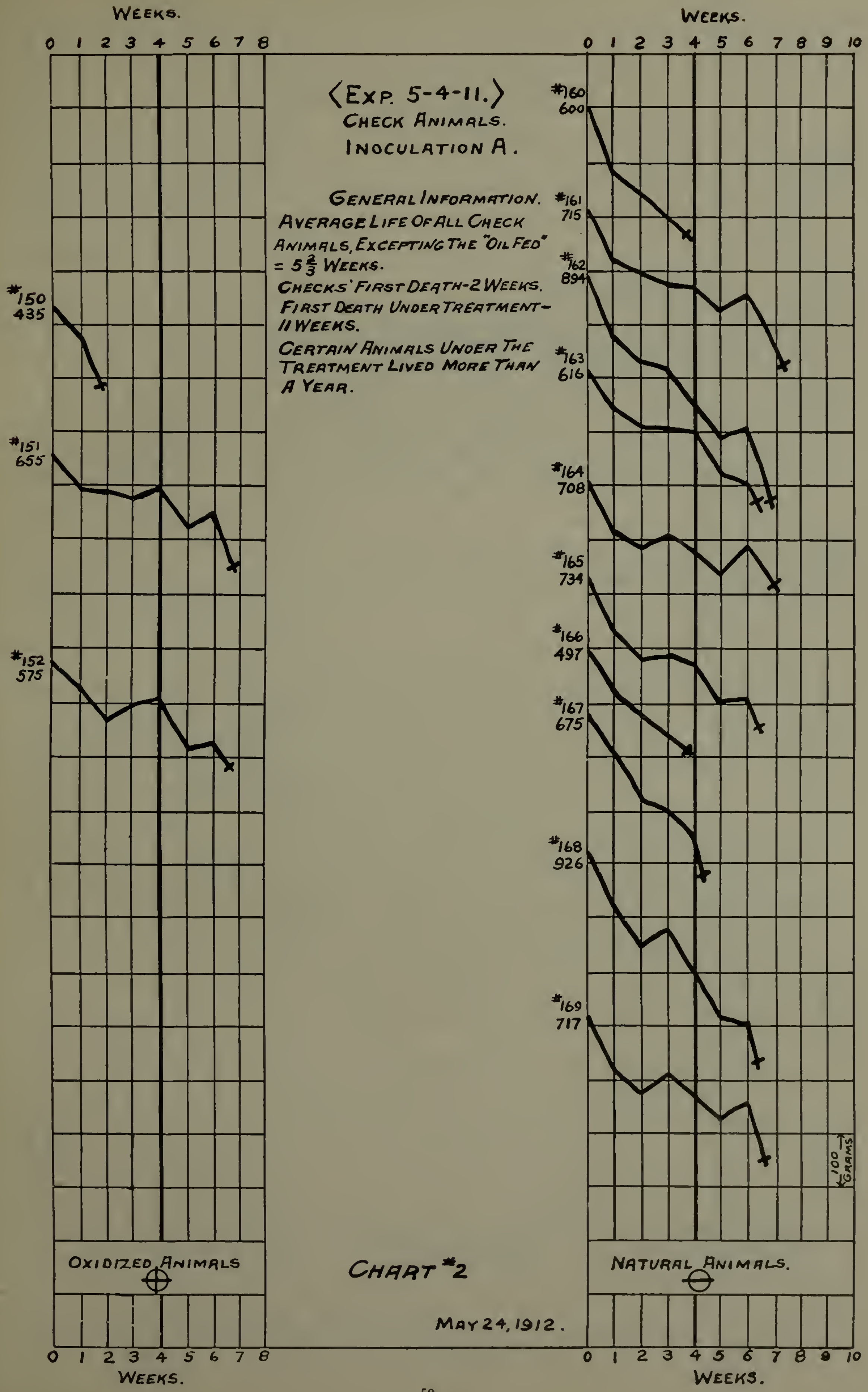
If the power of intensified oxygen can materially affect the situation with which we are here brought face to face, then there can be no doubt of the value of our process and nothing should be allowed to stand in the path of its full development.

On page 60, we place CHART NO. 3, Check Animals Inoculation "*B*," which consists of fifty million germs, one half the strength of the "*A*" inoculation.

Note on the left column the ⊕ animals—No. 171 fights for eighteen weeks—and that they all lose less rapidly than the ⊖ ones on the right of the drawing. Among the latter notice the fearful losses of No. 184 and No. 189; study carefully the curve of each of the fourteen, for in each can be found distinctions all tending to make clear the path we are following.

Turn to CHART NO. 4, page 62, "*C*" inoculation, or twenty-five million germs. Exactly the same results are found, greater strength for the previously oxidized animals. Examine the curves closely. See the loss of over four hundred grams in two weeks by animal No. 205, ⊖. Look at No. 206. The results are undeniable and we must admit that oxygen has asserted itself as a factor in the battle.

Please note that we are using large numbers of animals, that the record of each is before us and that the results are conclusive.

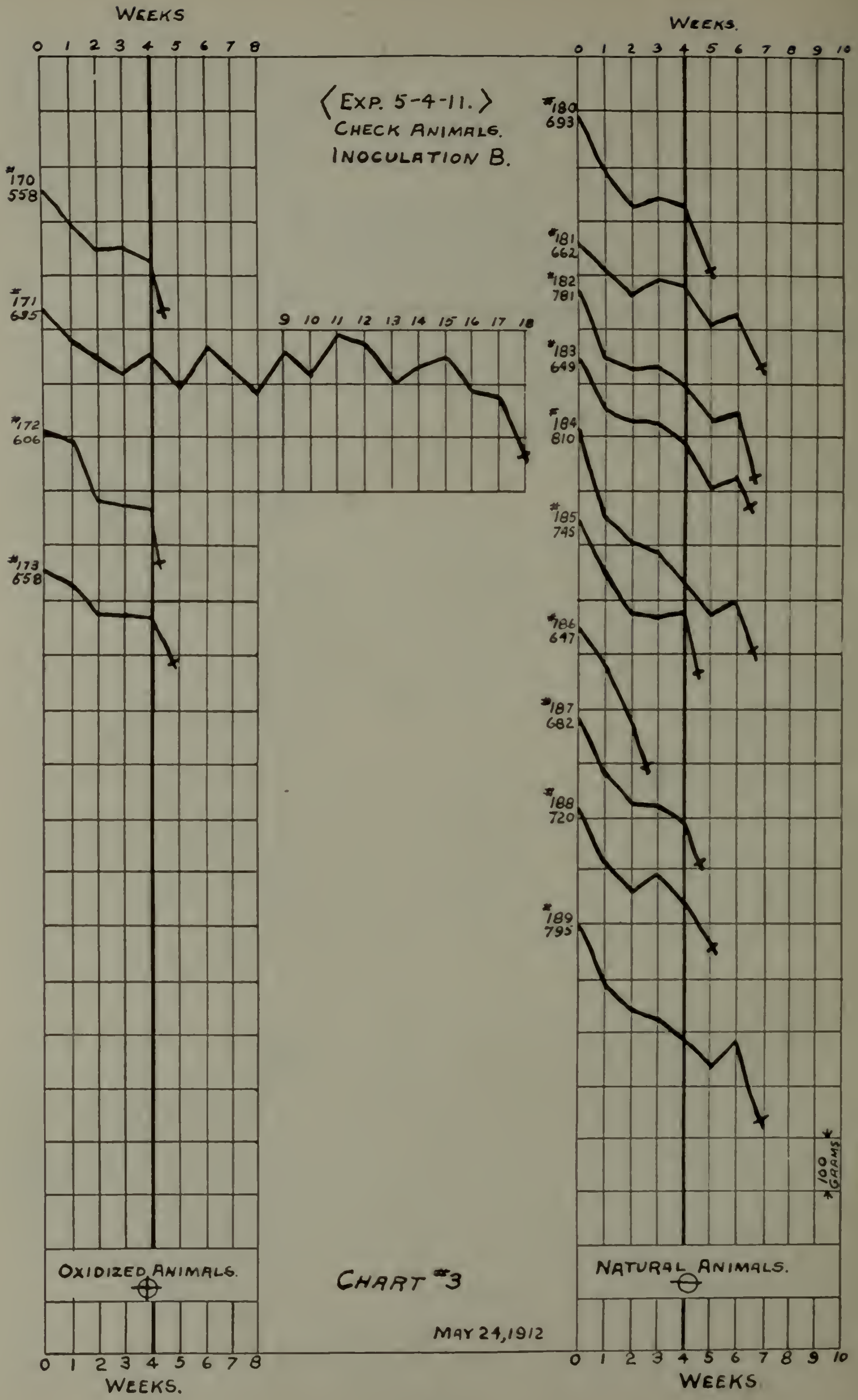


⟨EXP. 5-4-11.⟩
CHECK ANIMALS.
INOCULATION A.

GENERAL INFORMATION.
AVERAGE LIFE OF ALL CHECK ANIMALS, EXCEPTING THE "OIL FED" = $5\frac{2}{3}$ WEEKS.
CHECKS' FIRST DEATH-2 WEEKS.
FIRST DEATH UNDER TREATMENT-11 WEEKS.
CERTAIN ANIMALS UNDER THE TREATMENT LIVED MORE THAN A YEAR.

CHART #2

MAY 24, 1912.


WEEKS
0 1 2 3 4 5 6 7 8
⟨EXP. 5-4-11.⟩
CHECK ANIMALS.
INOCULATION B.
#170 558
#171 695
9 10 11 12 13 14 15 16 17 18
#172 606
#173 658
OXIDIZED ANIMALS.
0 1 2 3 4 5 6 7 8
WEEKS.
CHART #3
MAY 24, 1912
WEEKS.
0 1 2 3 4 5 6 7 8 9 10
#180 693
#181 662
#182 781
#183 649
#184 810
#185 745
#186 647
#187 682
#188 720
#189 795
100 GRAMS
NATURAL ANIMALS.
0 1 2 3 4 5 6 7 8 9 10
WEEKS

Among these animals is where we largely obtain the information that the number of germs used has little to do with the result. This is clearly shown by the three different inoculations we have just studied.

On page 63 we place CHART NO. 5—CHECK ANIMALS.

This chart brings the curves into close comparison on the question of the O plus and the O minus and also shows the lack of distinction due to the varying number of germs used in the different inoculations. It is left without further comment.

Leaving the check animals we will take up the animals under our treatment.

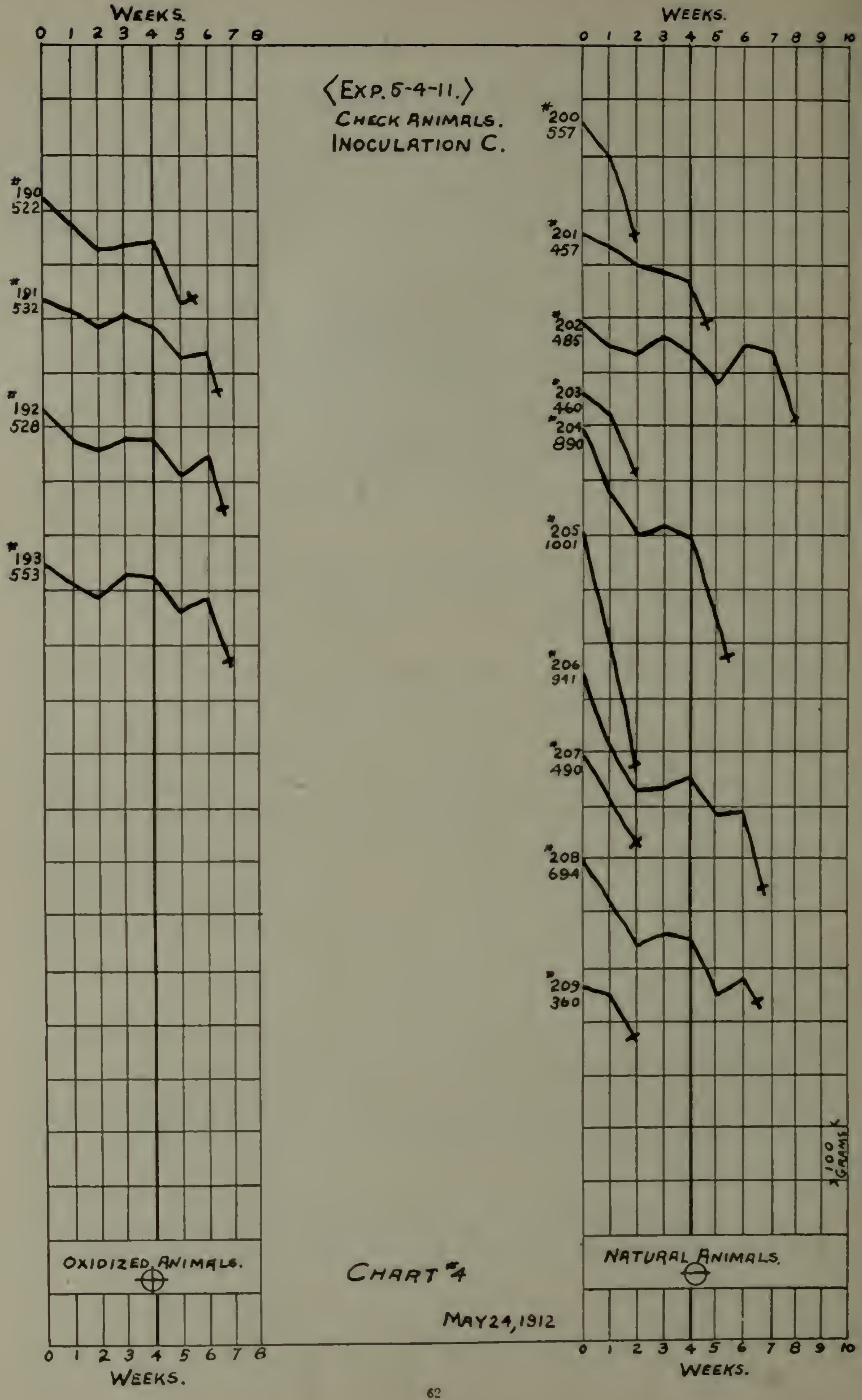
CHART NO. 6, page 64, shows the results obtained with "*A*" inoculation under two per cent. of the gas on the previously oxidized animals, the ⊕.

Now turn back to the corresponding check animals CHART NO. 2, page 59, and look first at it and then at this CHART NO. 6, for this matter is very important. See how all is changed, for these animals do not lose weight after inoculation but *actually spring forward to meet the foe that has been placed within their bodies. Every one of the six gains heavily in weight during the first two weeks, while every check animal lost heavily during this period. Could evidence be stronger?*

CHART NO. 7, page 67. Here we have ten natural animals corresponding to the oxidized ones shown on CHART NO. 6.

Comparing them in like manner to the check animals, their lives stretch out, their curves are placid and many strongly rising in weight, while one half of them live more than six months. Examine the record of animal No. 16. It rose from 447 grams to over 800 grams with one hundred million of the tubercle bacilli within it as a starter.

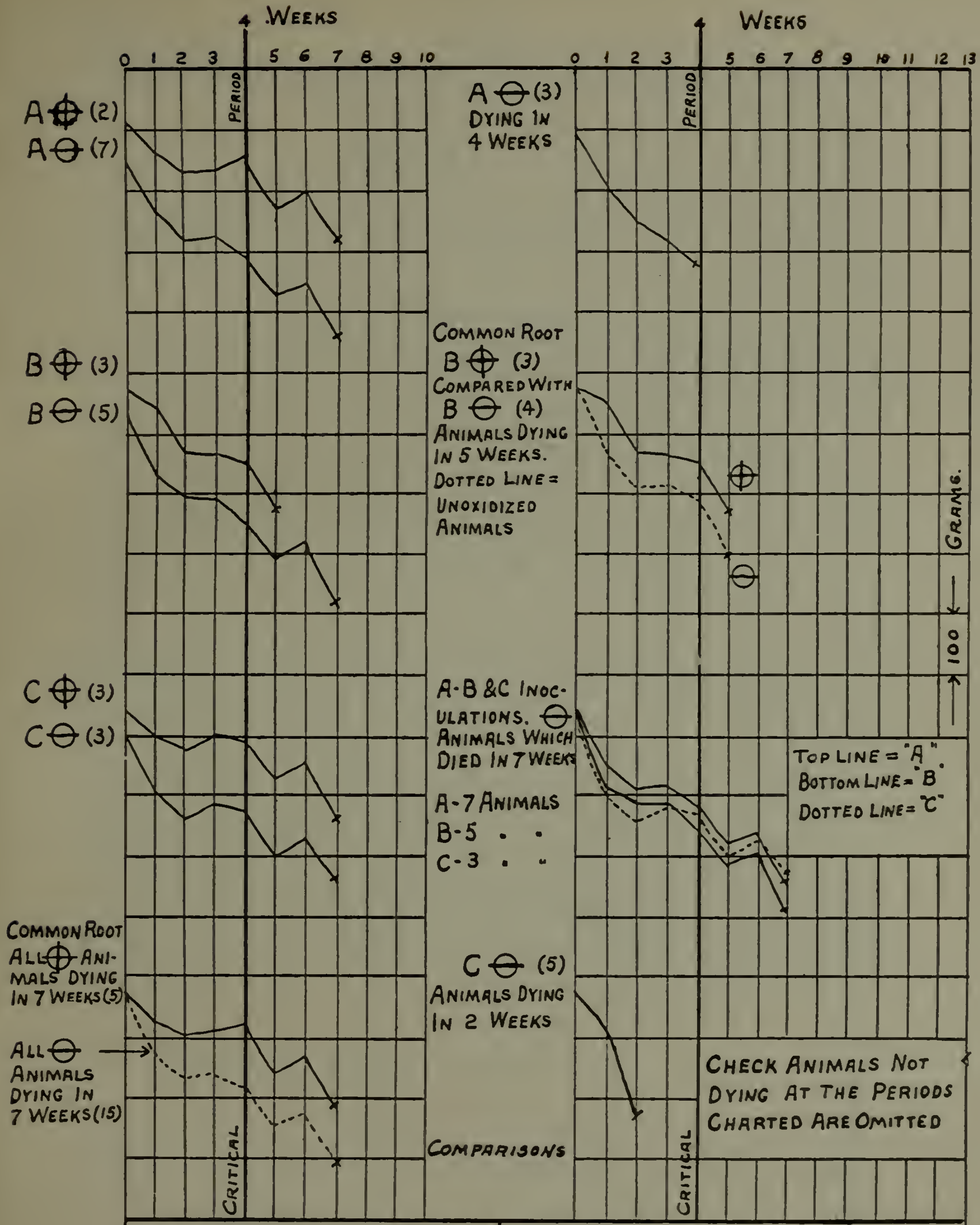
It will be found very interesting to take these records as well as those of other animals we give and compare them with animals of



⟨EXP. 5-4-11.⟩
CHECK ANIMALS.
INOCULATION C.

CHART #4

MAY 24, 1912



Inoculation A = 100 Million Germs.
" " B = 50 " "
" " C = 25 " "

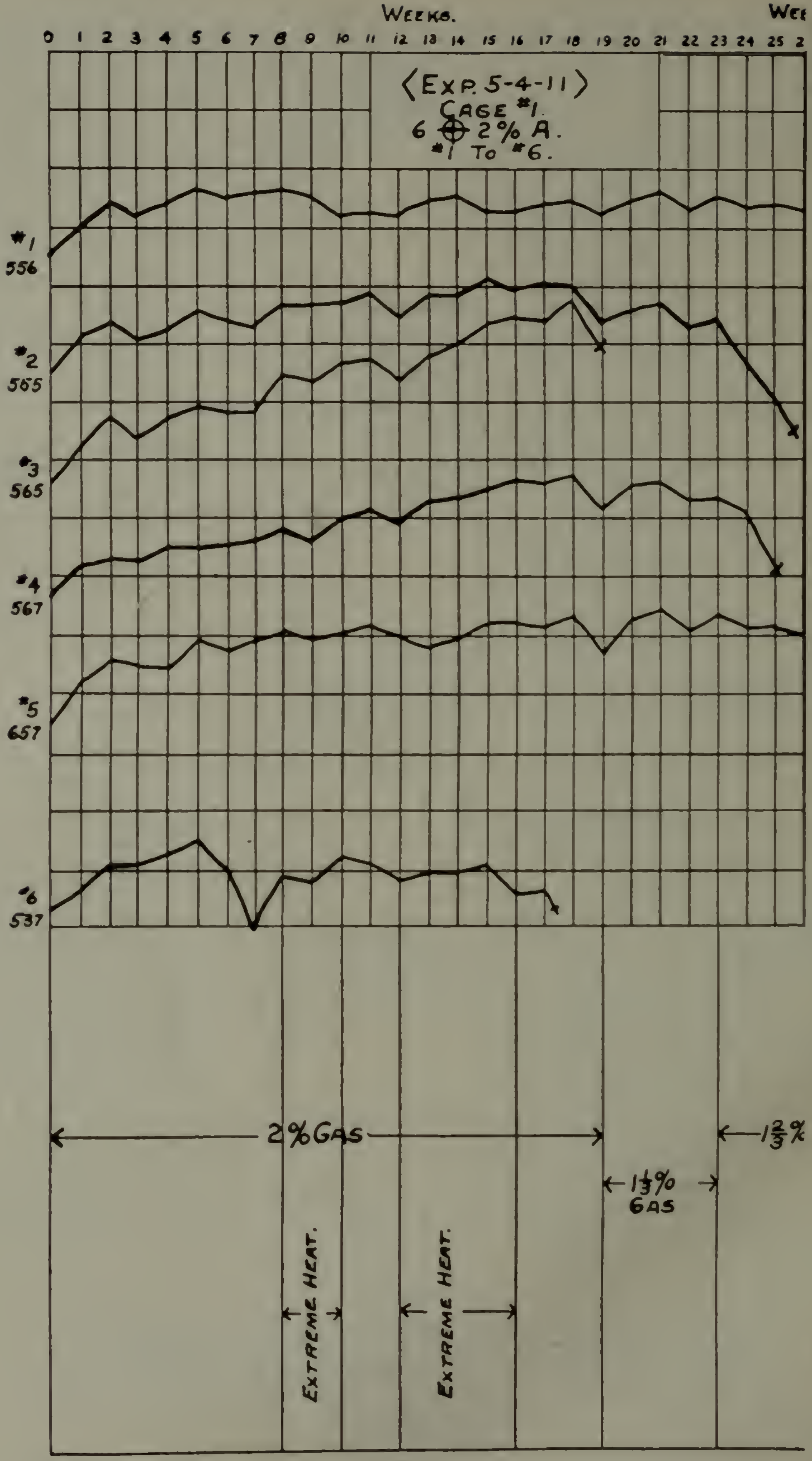
⊕ = Animals Oxidized Before Inoculation.
⊖ = " " Not " " " "

Examples

B⊖ = "B" Inoculation, Animals Not Oxidized Before Inoculation
C⊕ = "C" Inoculation, Animals Oxidized Before Inoculation
The Number Of Animals Involved Is Shown In Brackets ( )

⟨Experiment 5-4-11⟩
Check Animals.
Chart #5

Jas. Dodd July, 1911.


Weeks.
Wee
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 2
⟨Exp. 5-4-11⟩
Cage #1.
6 ⊕ 2% A.
#1 To #6.
#1
556
#2
565
#3
565
#4
567
#5
657
#6
537
2% Gas
1⅓%
Gas
1⅔%
Extreme Heat.
Extreme Heat.

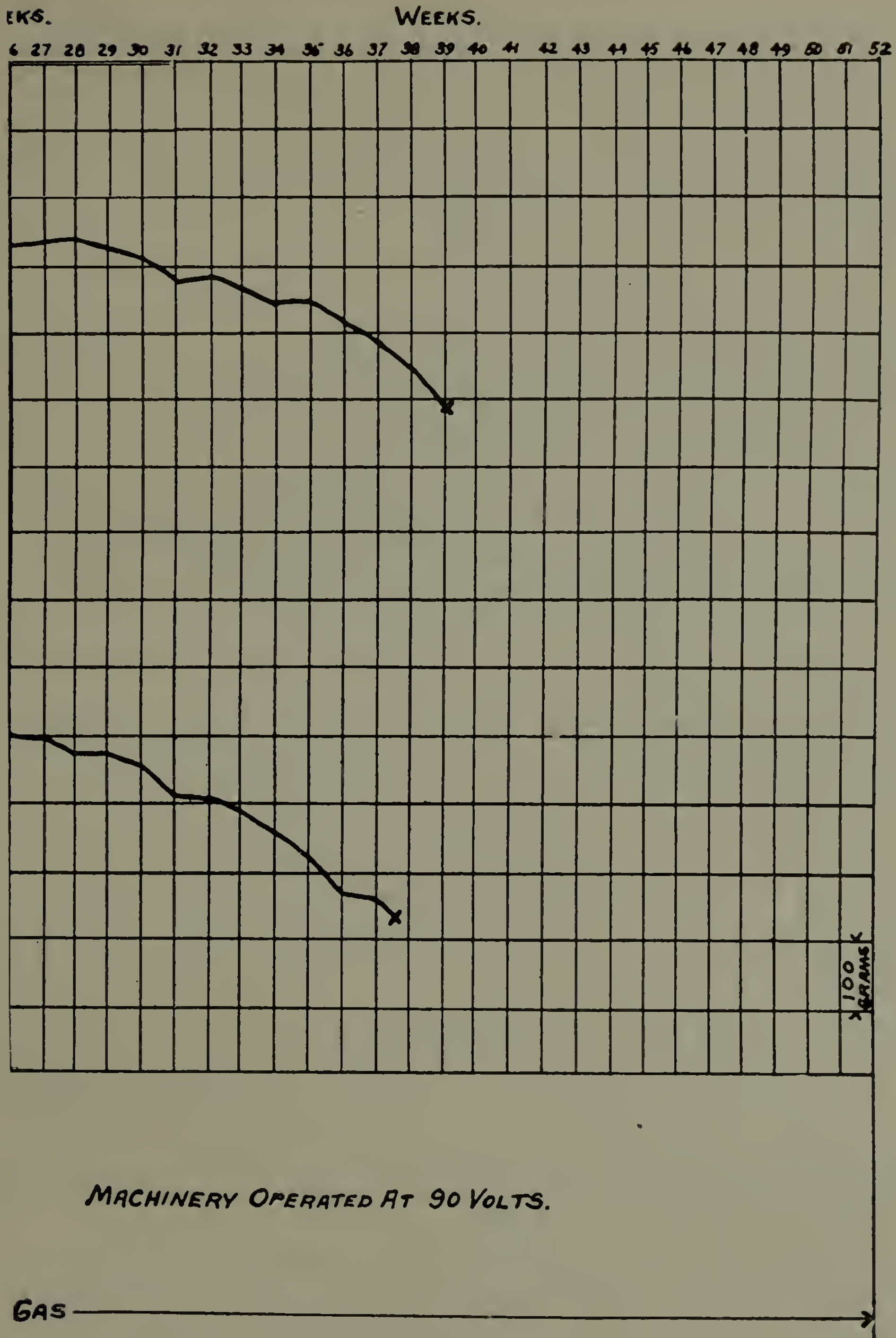
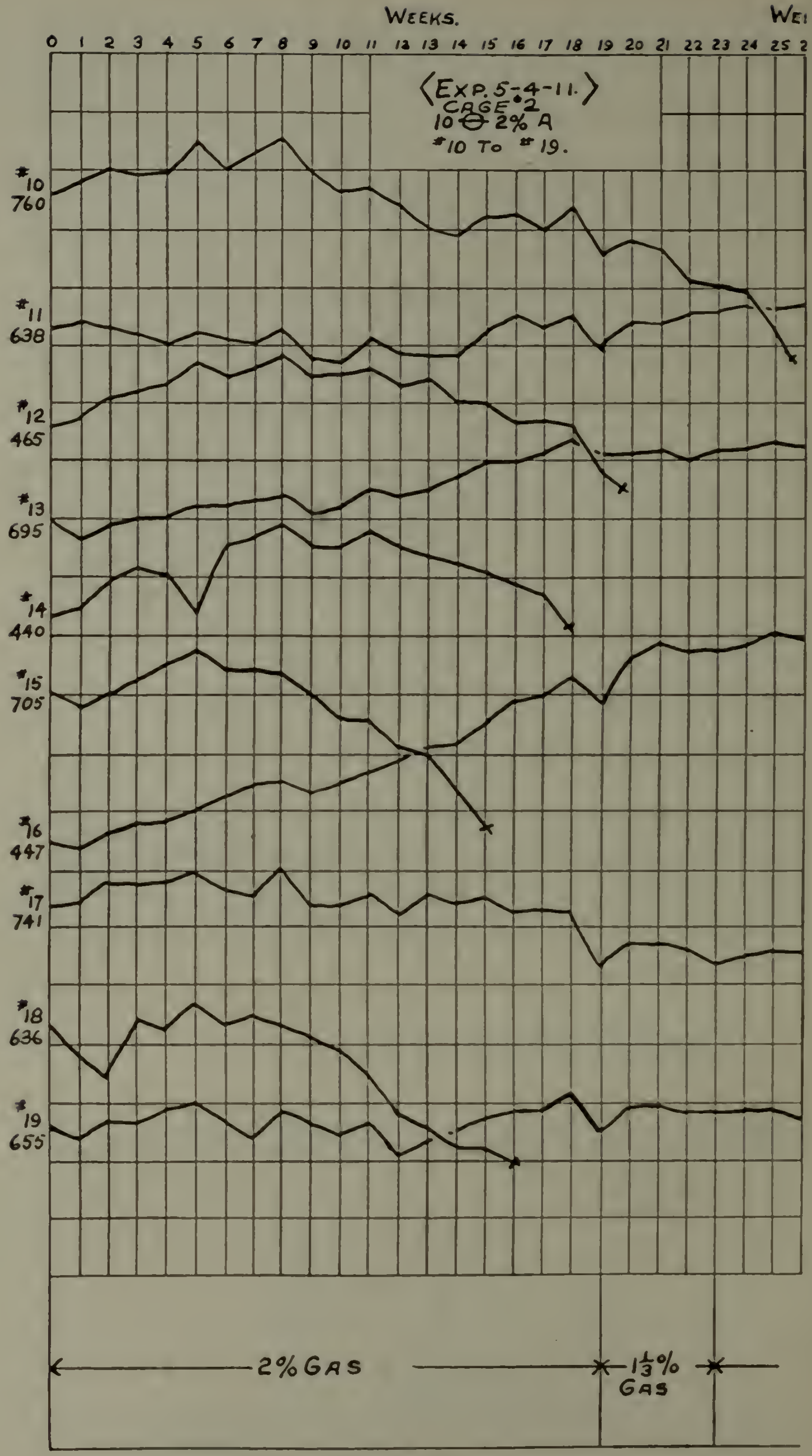


CHART #6

MAY 25, 1912.


Weeks.
We
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 2
⟨Exp. 5-4-11.⟩
Cage 2
10 ⊖ 2% A
#10 To #19.
#10
760
#11
638
#12
465
#13
695
#14
440
#15
705
#16
447
#17
741
#18
636
#19
655
2% Gas
1⅓%
Gas

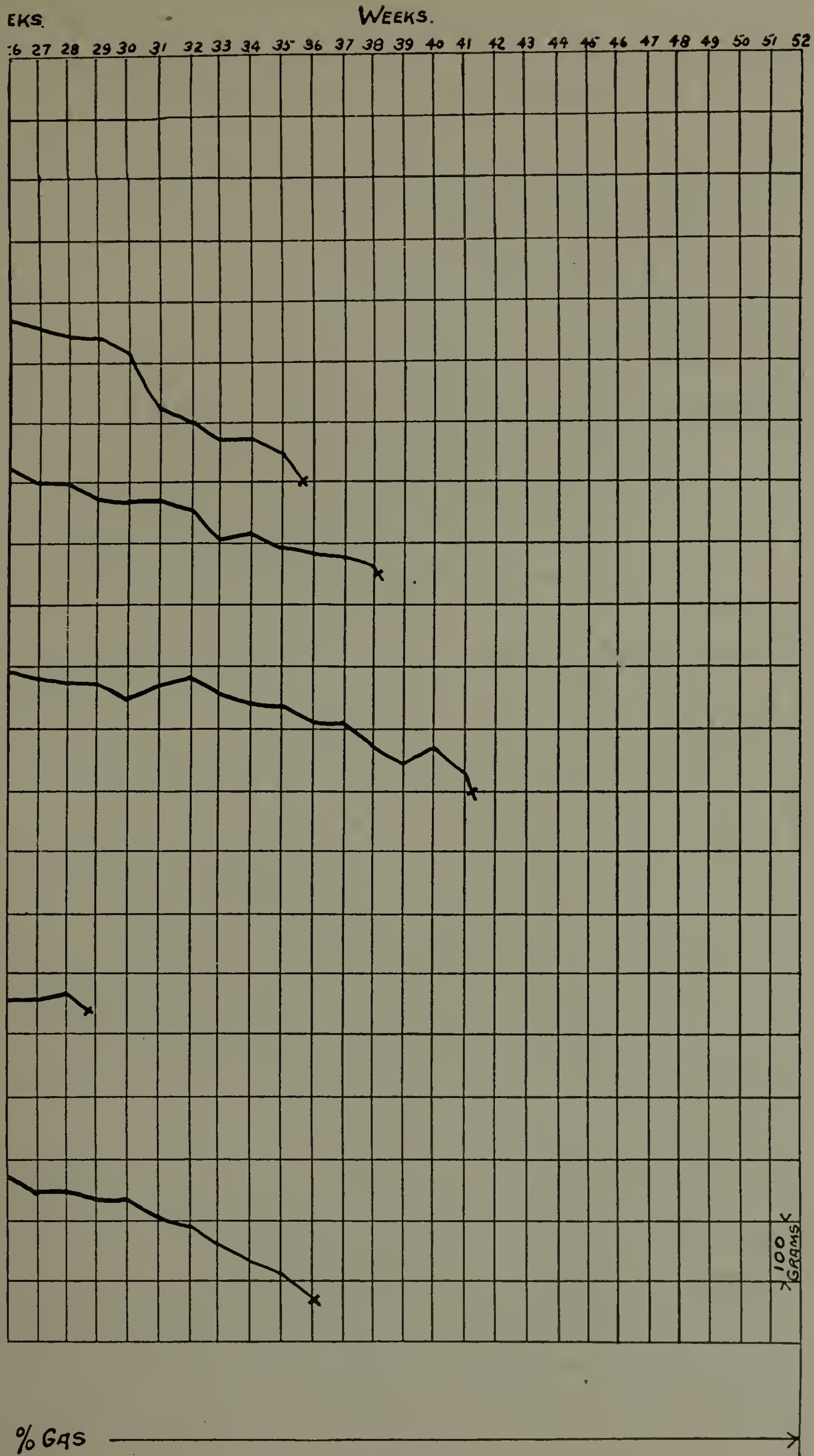


CHART #7.

MAY 27, 1912.

about the same weight, both among the check animals and in both classes of those under treatment. For instance, compare animal No. 13 on this chart with the natural check animal No. 164 on CHART NO. 2, page 59. The inoculation is the same, the weights at the time of inoculation vary only thirteen grams, so that the only difference is that one is a natural check animal, while the other is a natural animal carried in two per cent. of the gas after its inoculation.

There are numberless opportunities for striking comparisons that will occur to those interested and they will all be found to demonstrate the power of oxygen. The guinea pig is of the weakest, while man is the strongest in the animal kingdom and in this lies one of the great hopes of our process, and should never be lost sight of.

We hardly think it necessary to take time to go into the details of the difference between the O plus and the O minus as shown on CHARTS NO. 6 and NO. 7. The differences in favor of the previously oxidized animal are self-evident and oxidation establishes itself so strongly as not to need argument.

And now to accomplish our wish to deliver our work free from unnecessary argument and as tersely as possible, we are here giving, without one word of explanation, argument or comment, ten drawings (CHARTS NO. 8 to NO. 17 inclusive, pages 70 to 89) covering the individual records of eighty animals, including thirty of the previously oxidized, all inoculated and treated as shown by the drawings and we ask that you form your own conclusions from a study of each animal as a fair exchange for the years we have given to the work. This is a striking test of the work, to throw it upon the table alone. We do so because we know its inherent strength.

In examining the drawings, please bear in mind that three per cent. of the gas is depressive to the animals plunged into it and that due allowance must be made for this fact when considering the results.

A study of these curves convinces us that we have recovered much of the ground lost in the November Experiment. Our work is not yet up to the record made in the first two experiments, but we have it well in hand and do not again lose our control.

We will now proceed to the study of the autopsies, for they contain much information of value.

CHART NO. 18, page 91. On this one drawing are the complete autopsies of the forty-one check animals. They are purposely placed in the rotation of their death. The first six animals, as shown by the length of their life lines, died in two weeks. The disease is here strictly limited, only appearing at the point of inoculation.

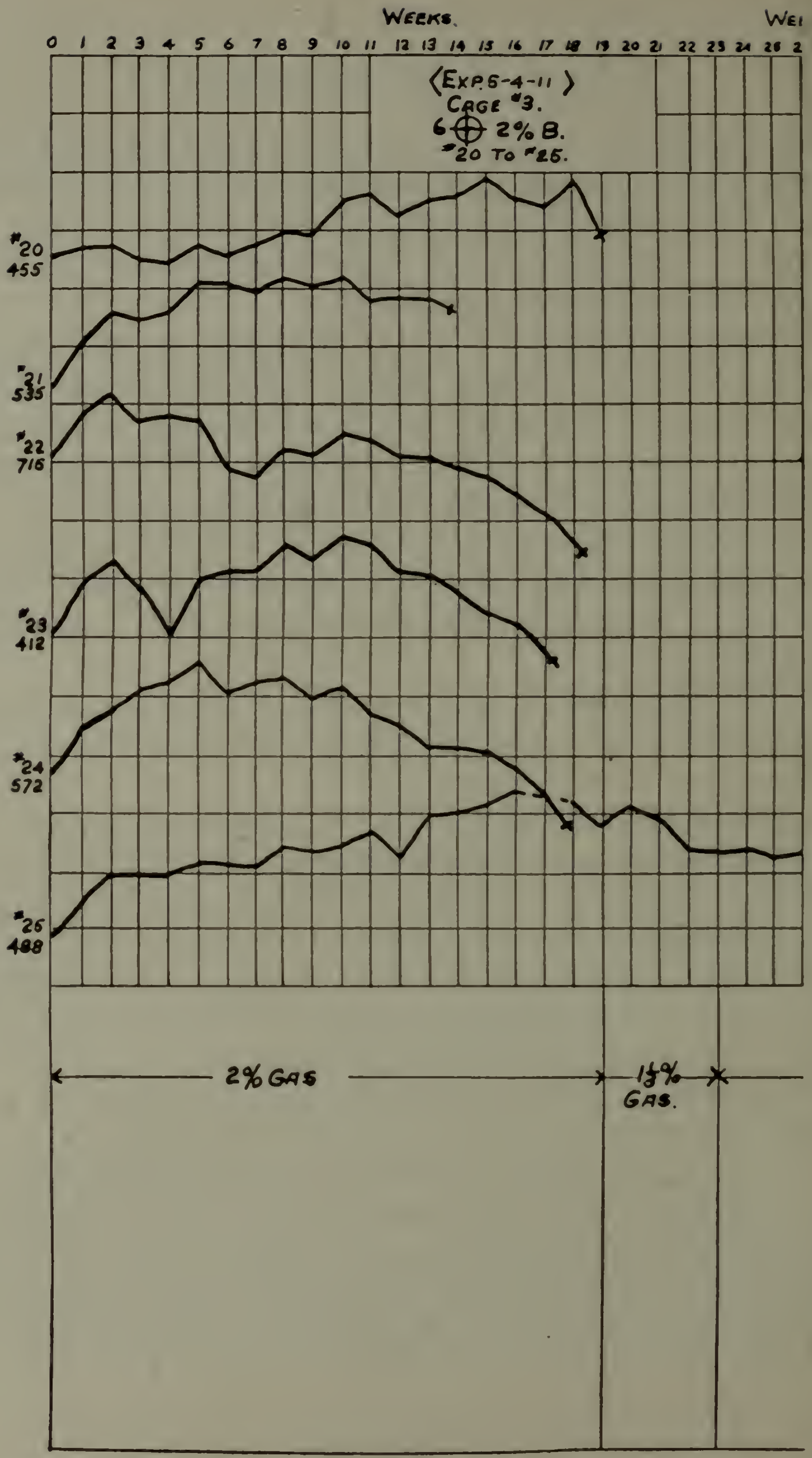
This fact bears out the record of the check animals in the January Experiment, all of which died within a few days and without tubercular lesions, showing that the disease can kill without tubercular destruction.

It also bears strongly upon the cause of death in the August Experiment for the same reason, none of the animals showing any evidence of tubercular destruction.

Commencing at animal No. 160, we have the record of seven animals dying one month after inoculation. Here we have heavy tubercular destruction in the glands throughout the body and the disease strongly present in the spleen and the liver. It is at this time that the animals were struck the tremendous blow; the critical period that we have so frequently spoken of, and which is here shown to be at the time of general involvement of the vital organs.

It is notable that all the animals dying in the period from the fourth to the eighth week show practically the same autopsies.

The last animal on the drawing, No. 171, was an O plus animal, "*B*" inoculation. This animal lived ten weeks after all the others were dead and the autopsy shows every organ in the last stages of destruction. A superficial view of this animal's record would, doubtless, lead to the conclusion that the oxygen to which he was exposed


Weeks.
Wei
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 2
⟨Exp. 5-4-11⟩
Cage #3.
6 ⊕ 2% B.
#20 to #25.
#20 455
#21 535
#22 716
#23 412
#24 572
#25 488
2% Gas
1⅓% Gas.

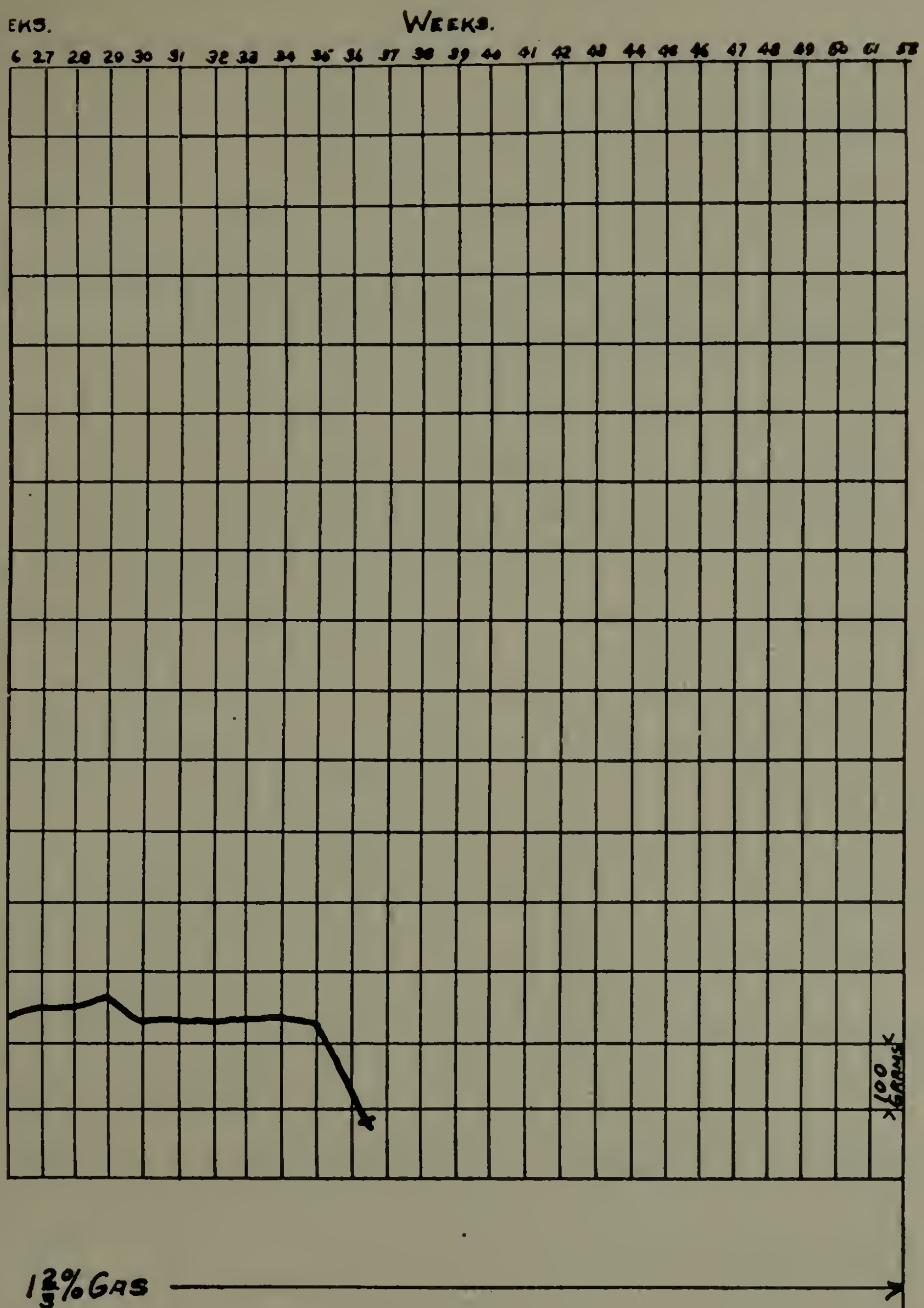
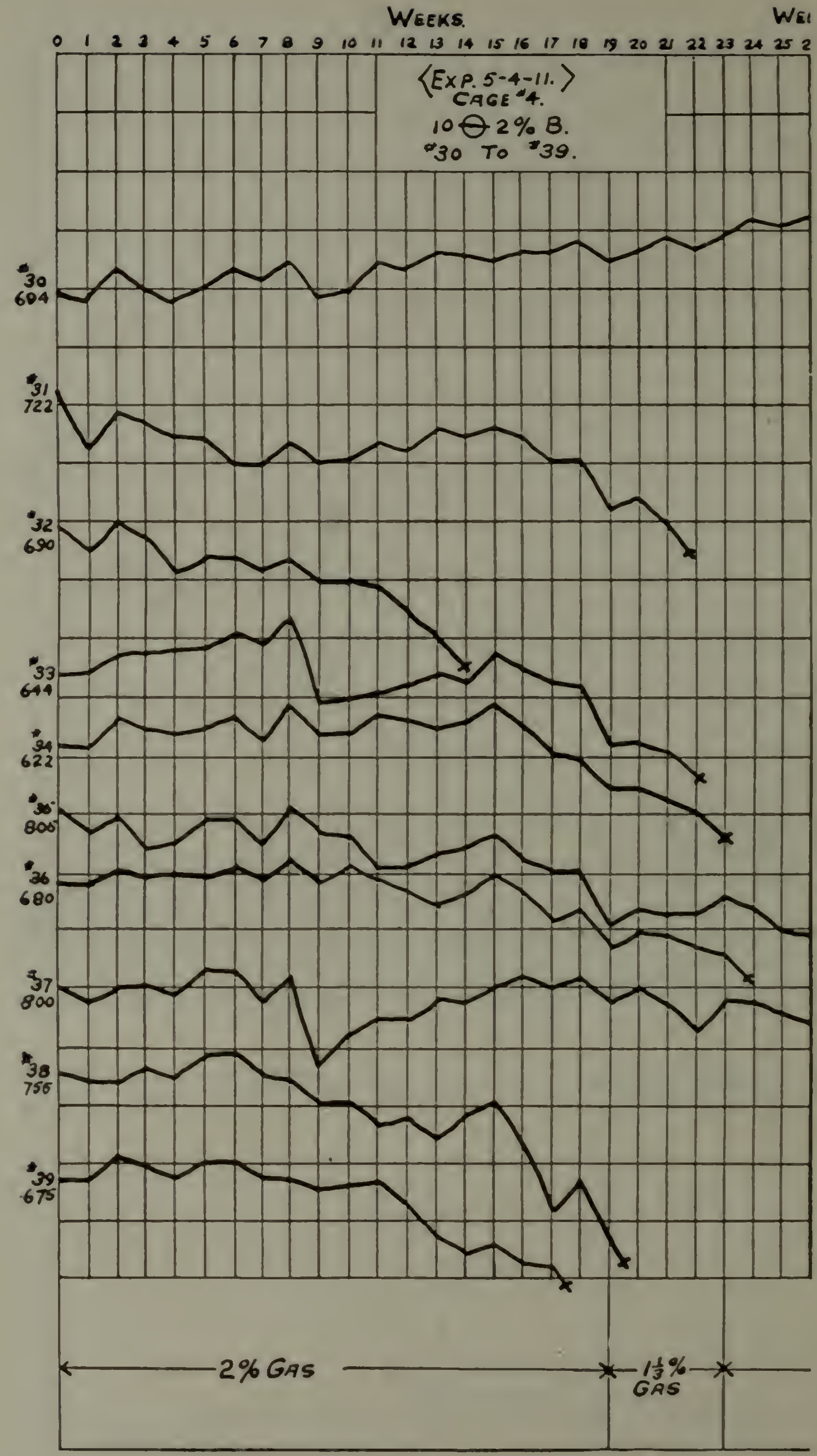


CHART #8.

MAY 28, 1912.


WEEKS.
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 2
WE
⟨EXP. 5-4-11.⟩
CAGE #4.
10 ⊖ 2% B.
#30 TO #39.
#30
694
#31
722
#32
690
#33
644
#34
622
#35
806
#36
680
#37
800
#38
756
#39
675
2% GAS
1⅓%
GAS

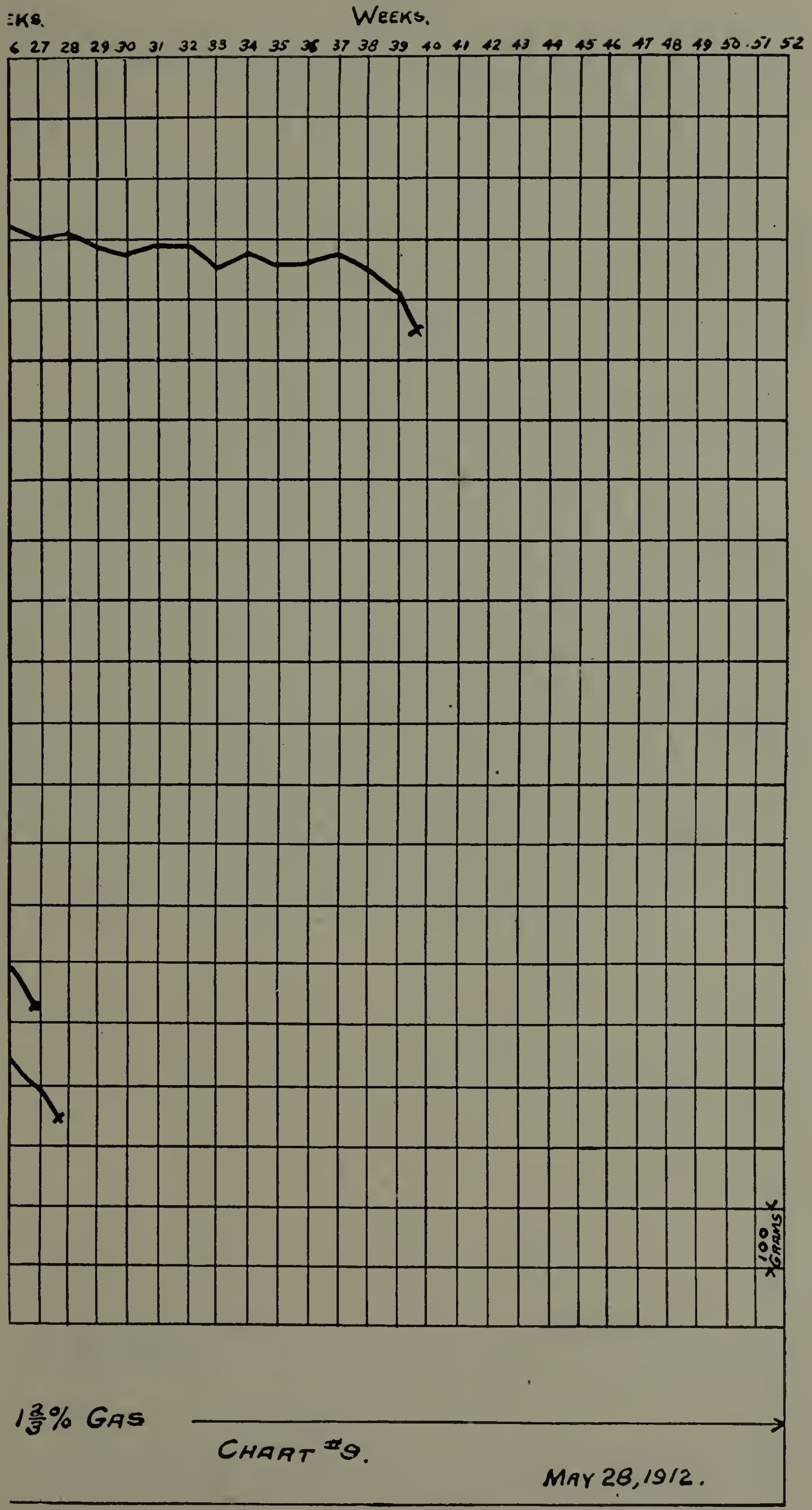
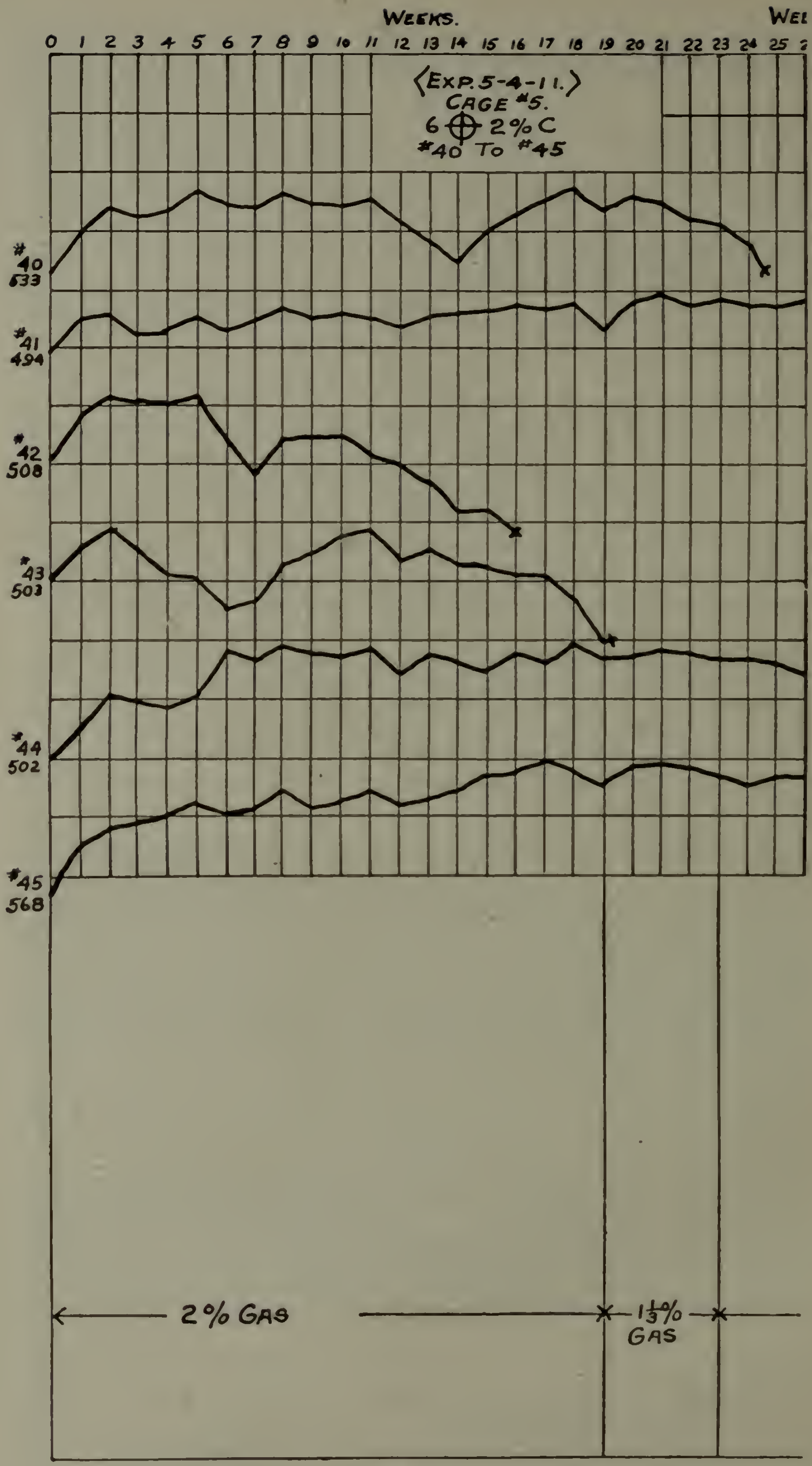


CHART #9.

MAY 28, 1912.


WEEKS.
WEE
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
⟨EXP. 5-4-11.⟩
CAGE #5.
6 ⊕ 2% C
#40 TO #45
#40
533
#41
494
#42
508
#43
503
#44
502
#45
568
2% GAS
1⅓% GAS

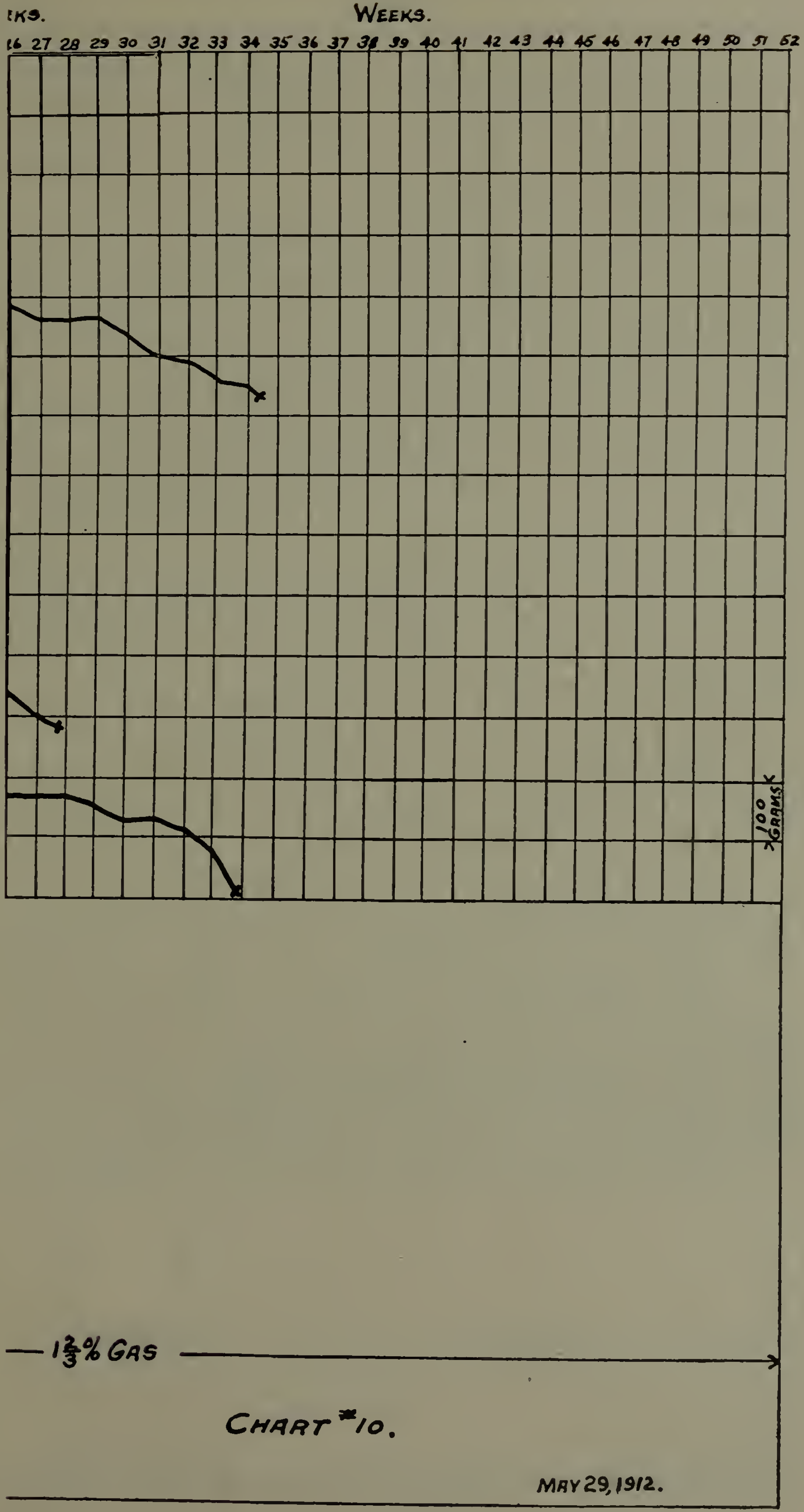
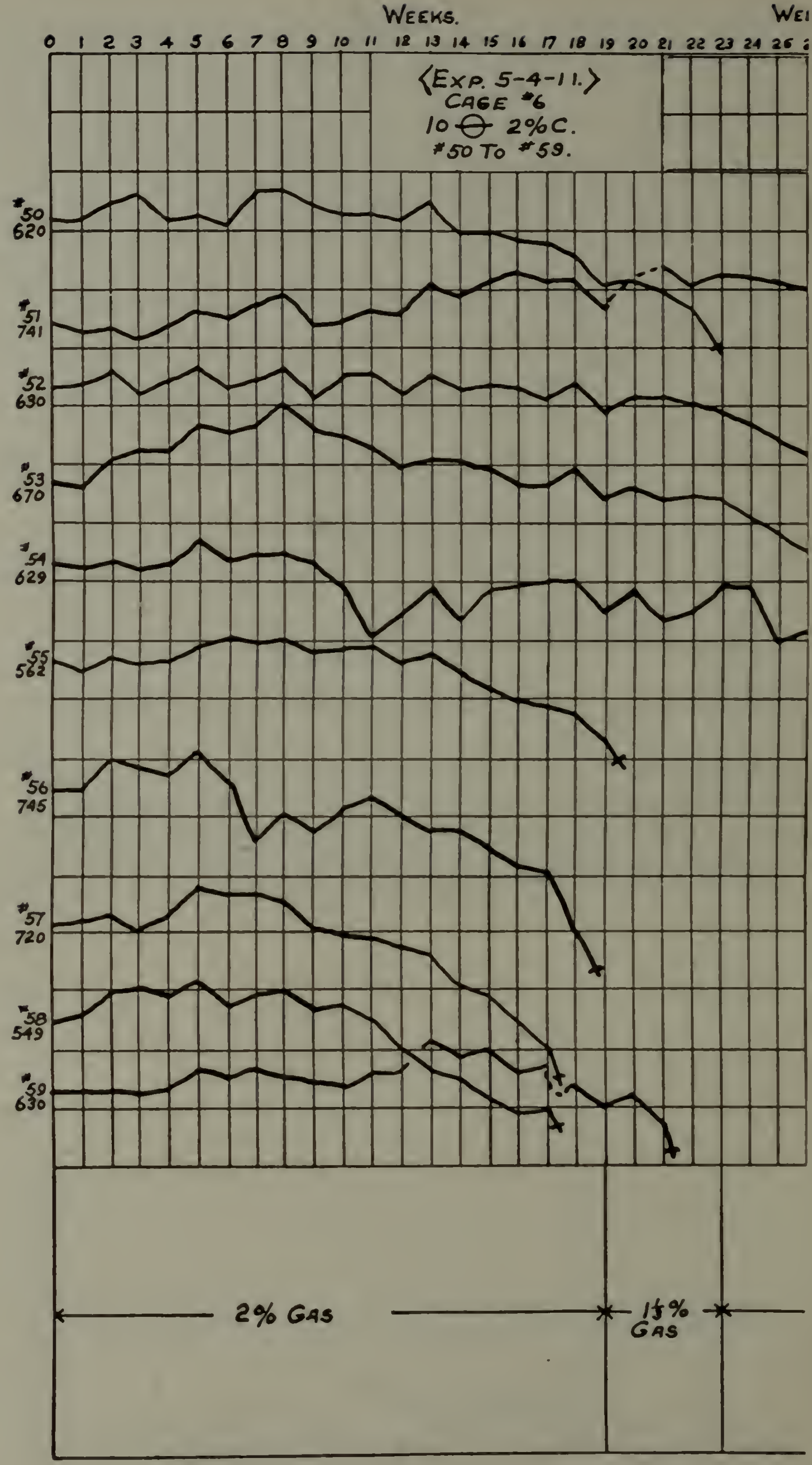

eks.
Weeks.
26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52
100 Grams
— 1⅔% Gas
May 29, 1912.

Chart #10.


Weeks.
Wei
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 26
⟨Exp. 5-4-11.⟩
Cage #6
10 ⊖ 2% C.
#50 To #59.
#50 620
#51 741
#52 630
#53 670
#54 629
#55 562
#56 745
#57 720
#58 549
#59 630
2% Gas
1½% Gas

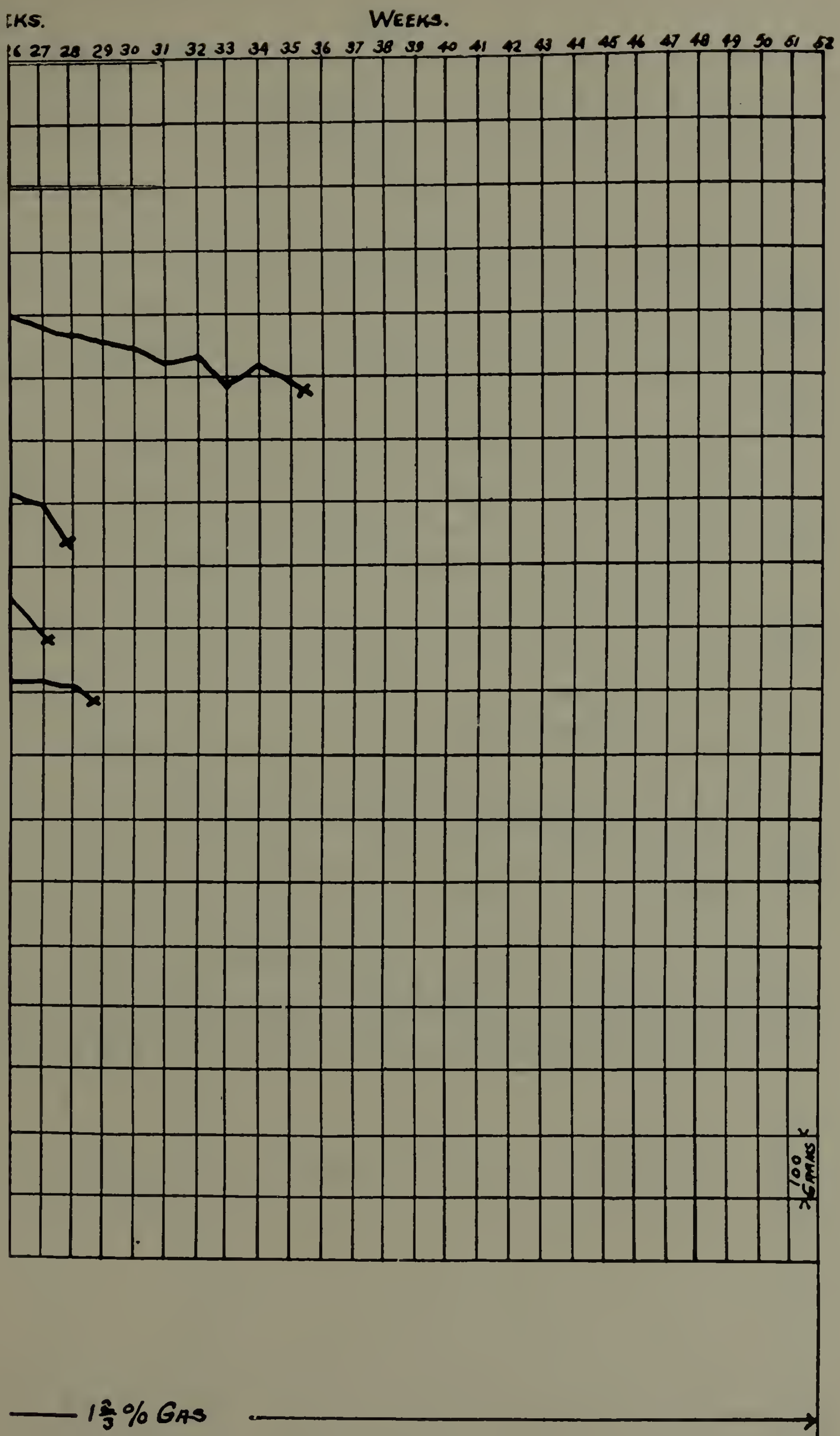
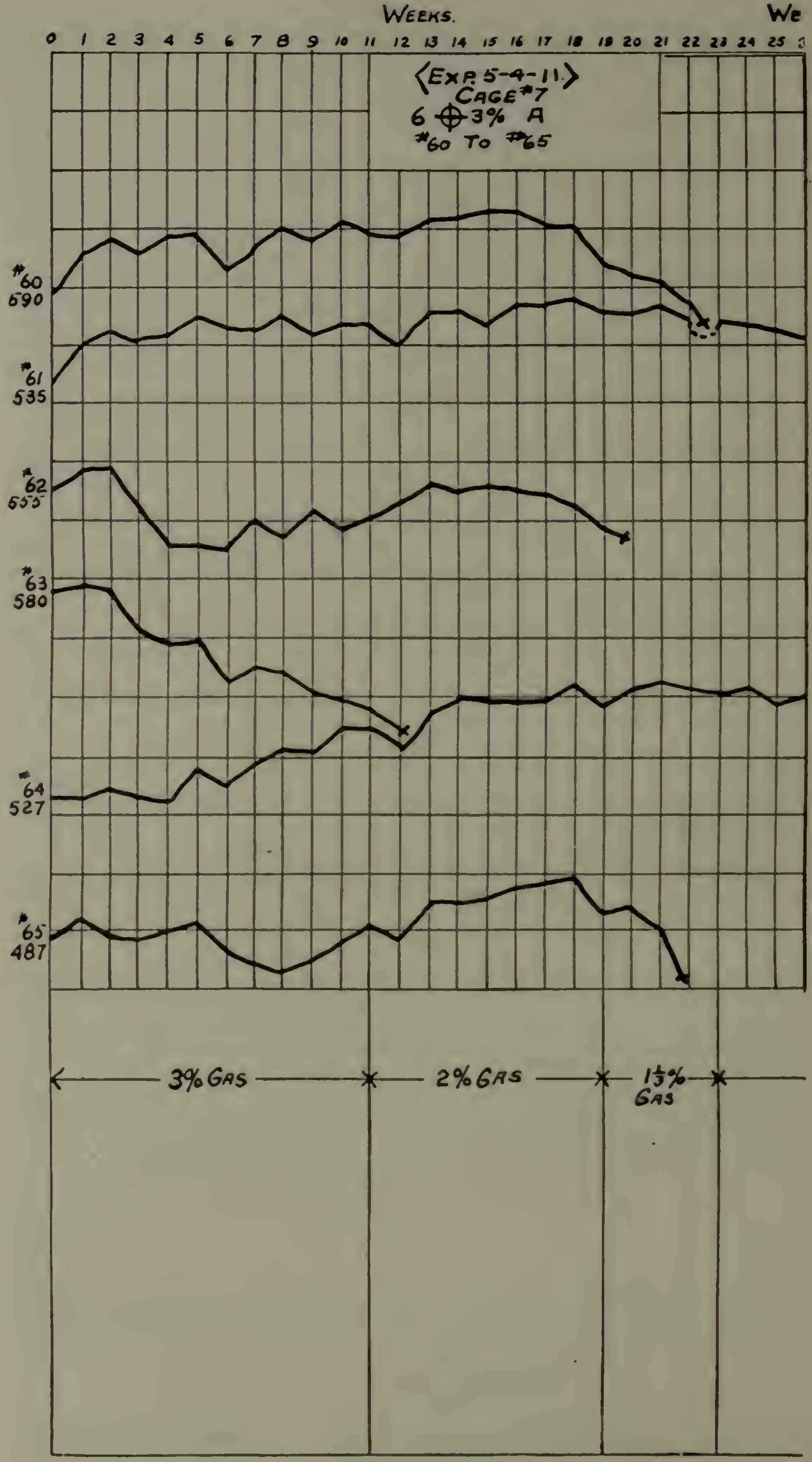


CHART #11.

MAY 29, 1912.


Weeks.
We
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
⟨Exp. 5-4-11.⟩
Cage #7
6 ⊕ 3% A
#60 To #65
#60
690
#61
535
#62
555
#63
580
#64
527
#65
487
3% Gas
2% Gas
1⅓%
Gas

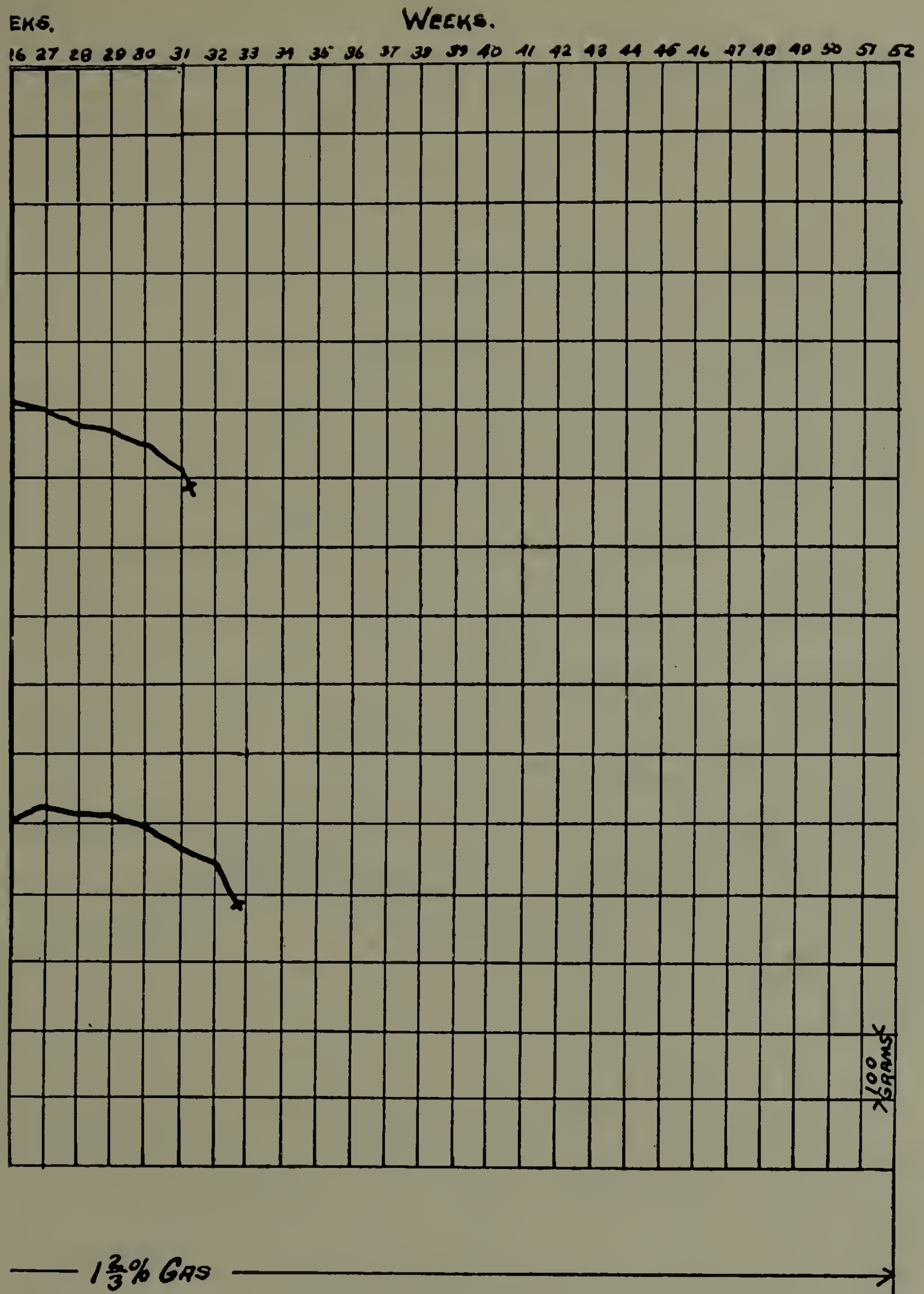
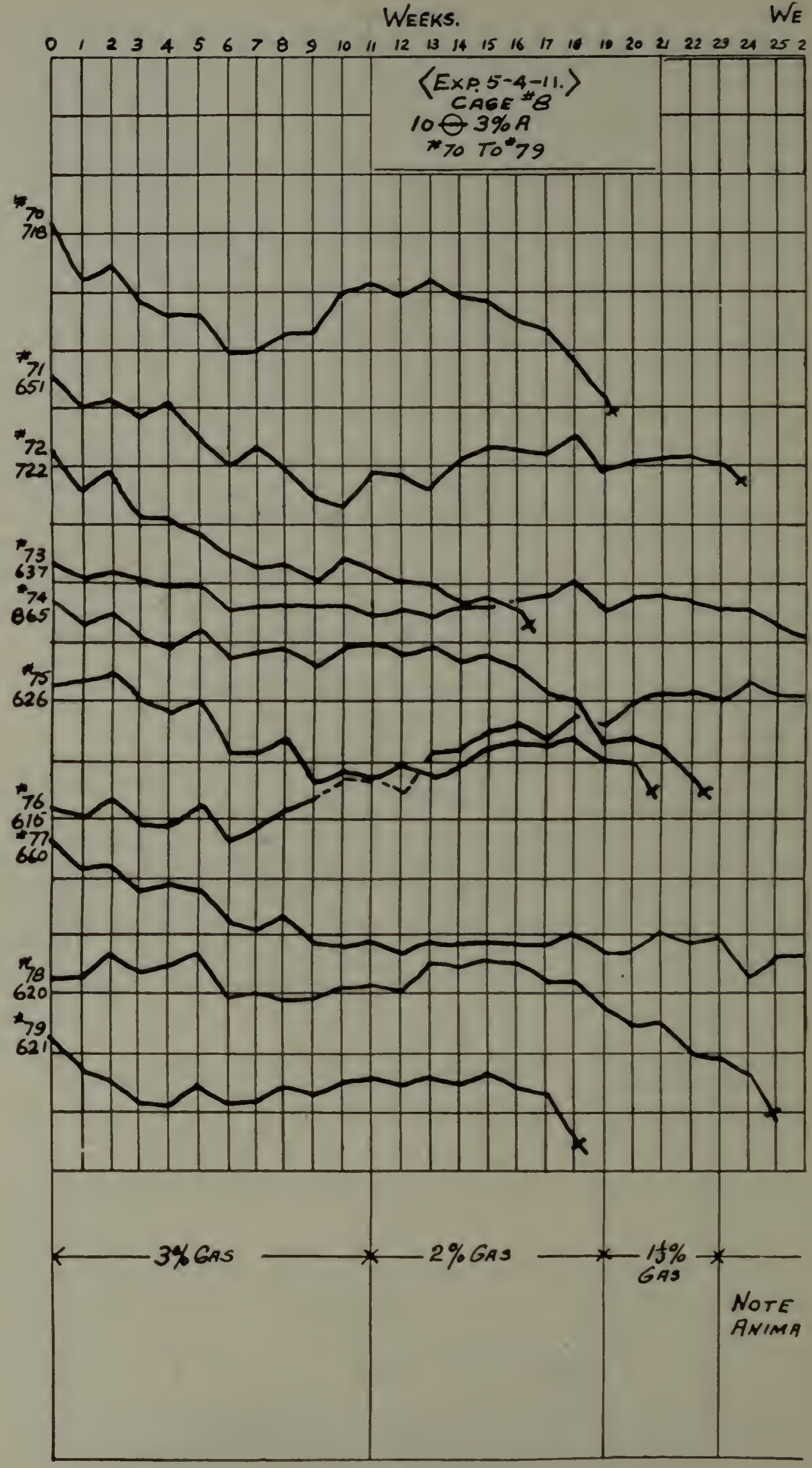
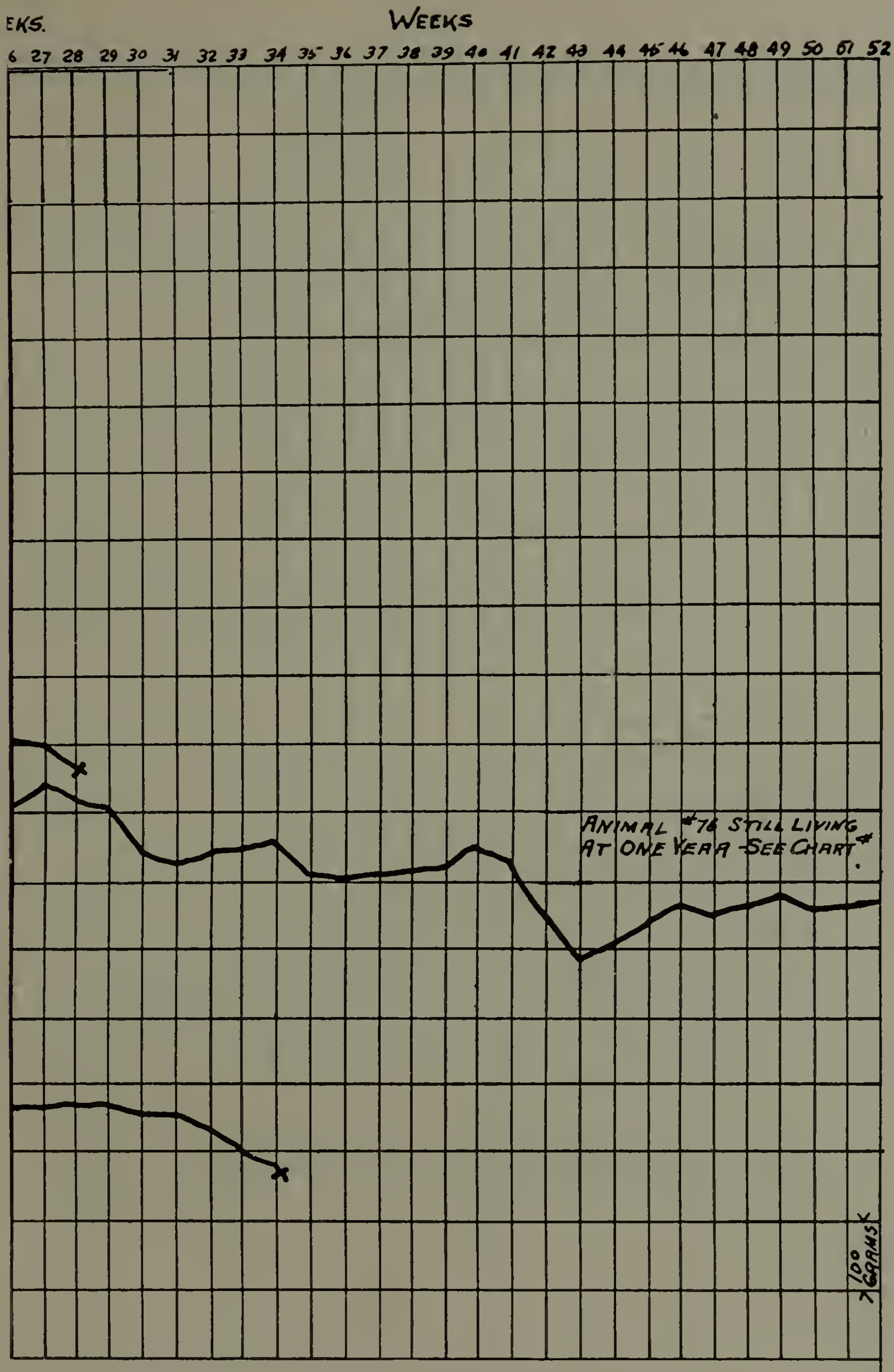


CHART #12.

MAY 29, 1912.


WEEKS.
WE
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 2
⟨EXP. 5-4-11.⟩
CAGE #8
10 ⊖ 3% A
#70 TO #79
#70 718
#71 651
#72 722
#73 637
#74 865
#75 626
#76 616
#77 660
#78 620
#79 621
3% GAS
2% GAS
1⅓% GAS
NOTE
ANIMA

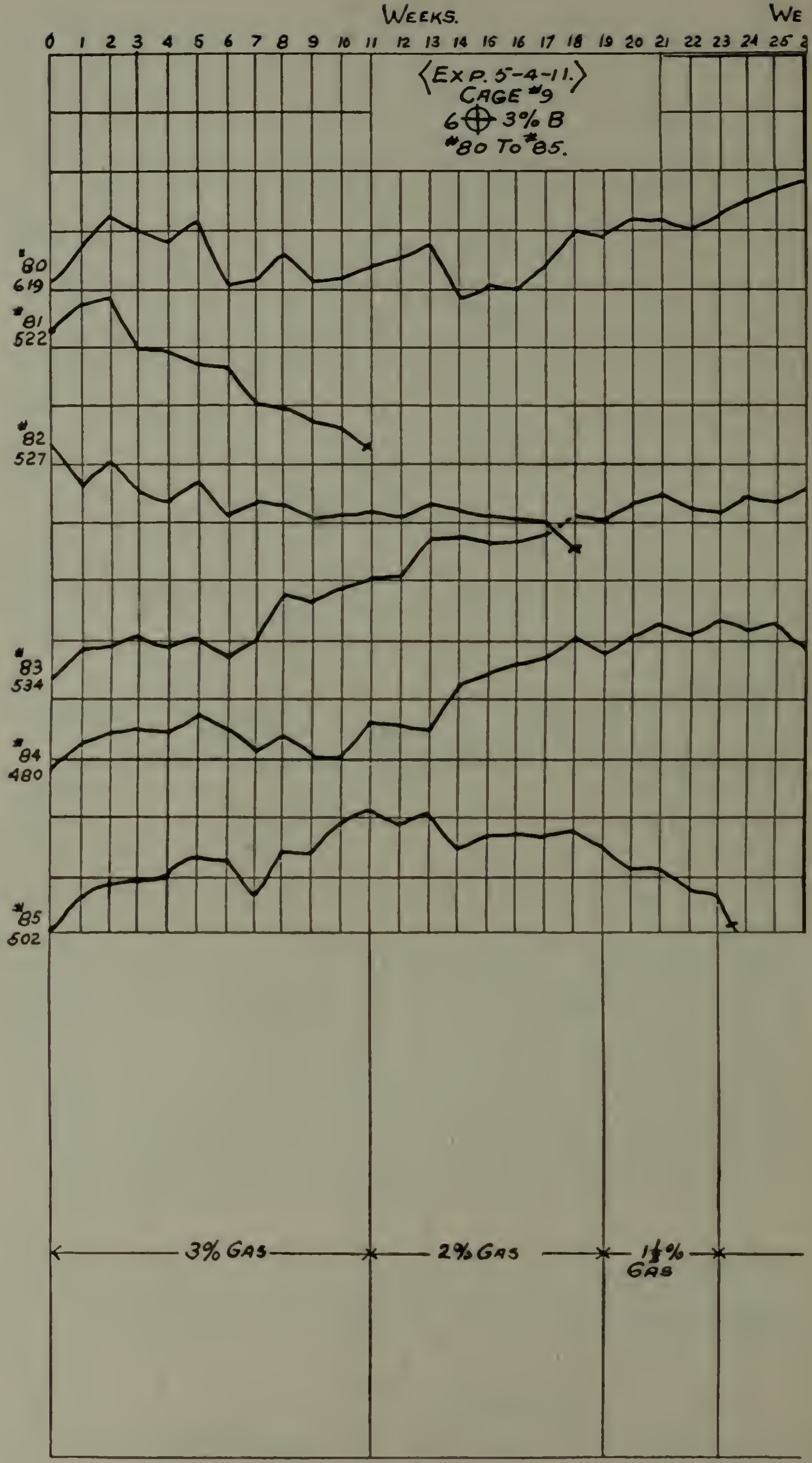


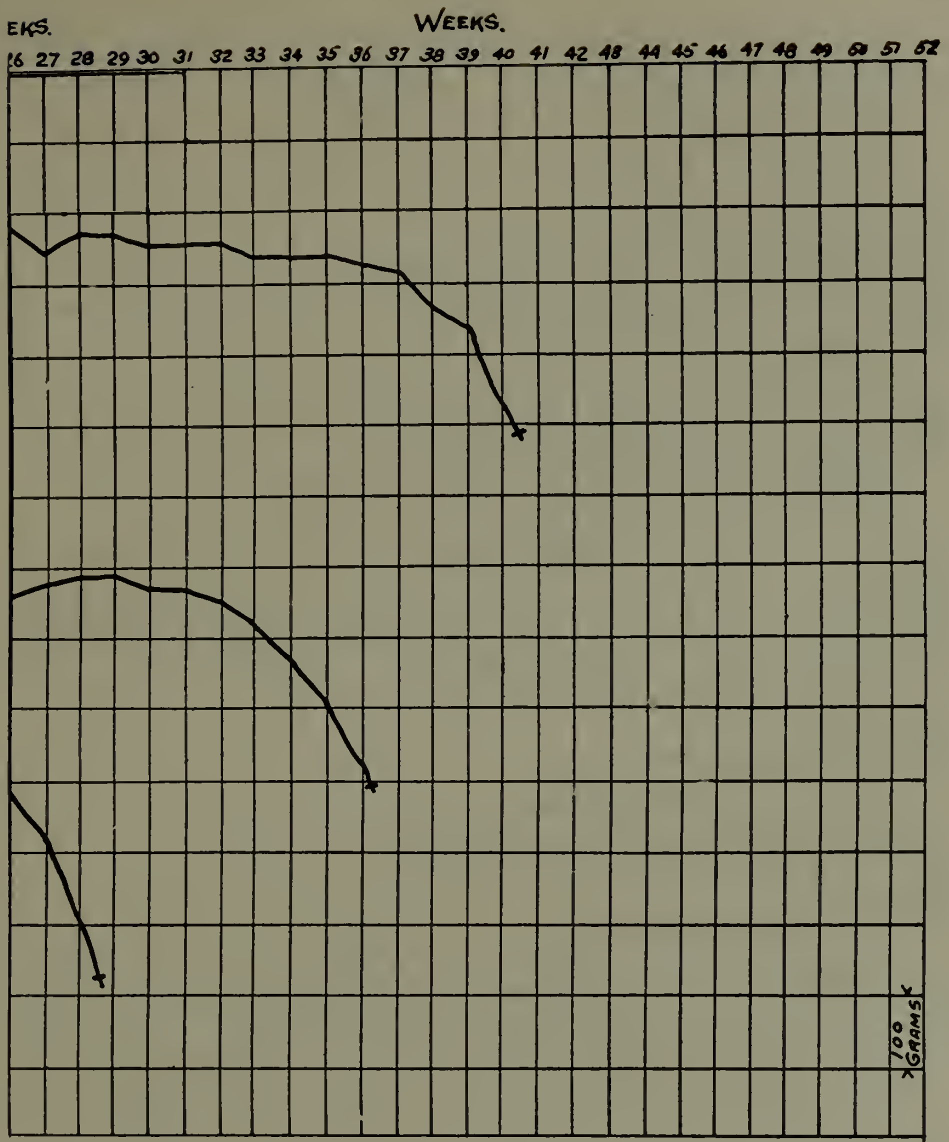
- 1⅔% GAS →

DEPRESSIVE CURVE IN 3% GAS COMPARED TO THE EQUIVALENT
LB IN 2% GAS.

CHART #13.

MAY 29, 1912


WEEKS.
WE
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
⟨EXP. 5-4-11.⟩
CAGE #9
6 ⊕ 3% B
#80 To #85.
#80
619
#81
522
#82
527
#83
534
#84
480
#85
502
3% GAS
2% GAS
1½%
GAS

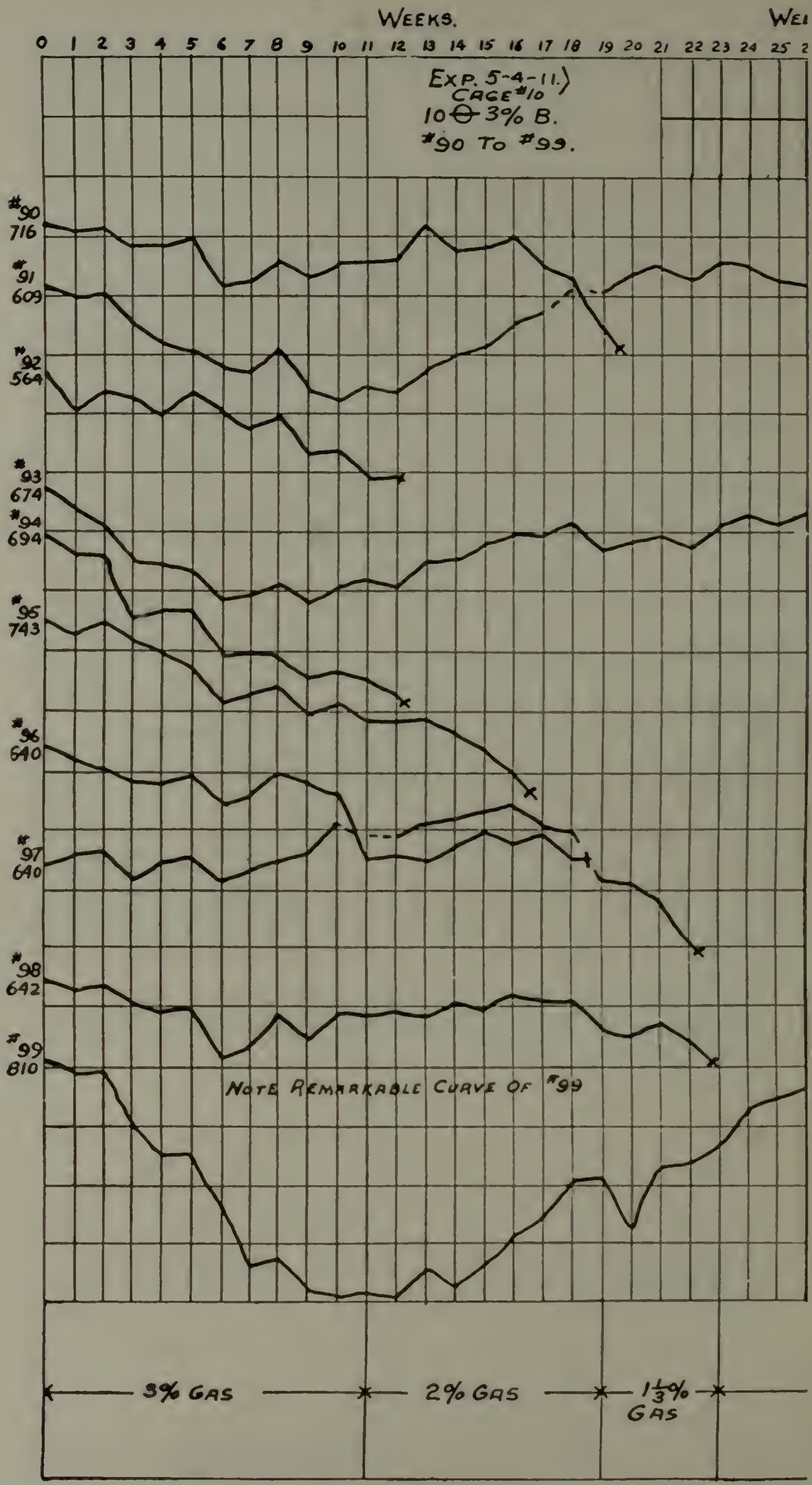


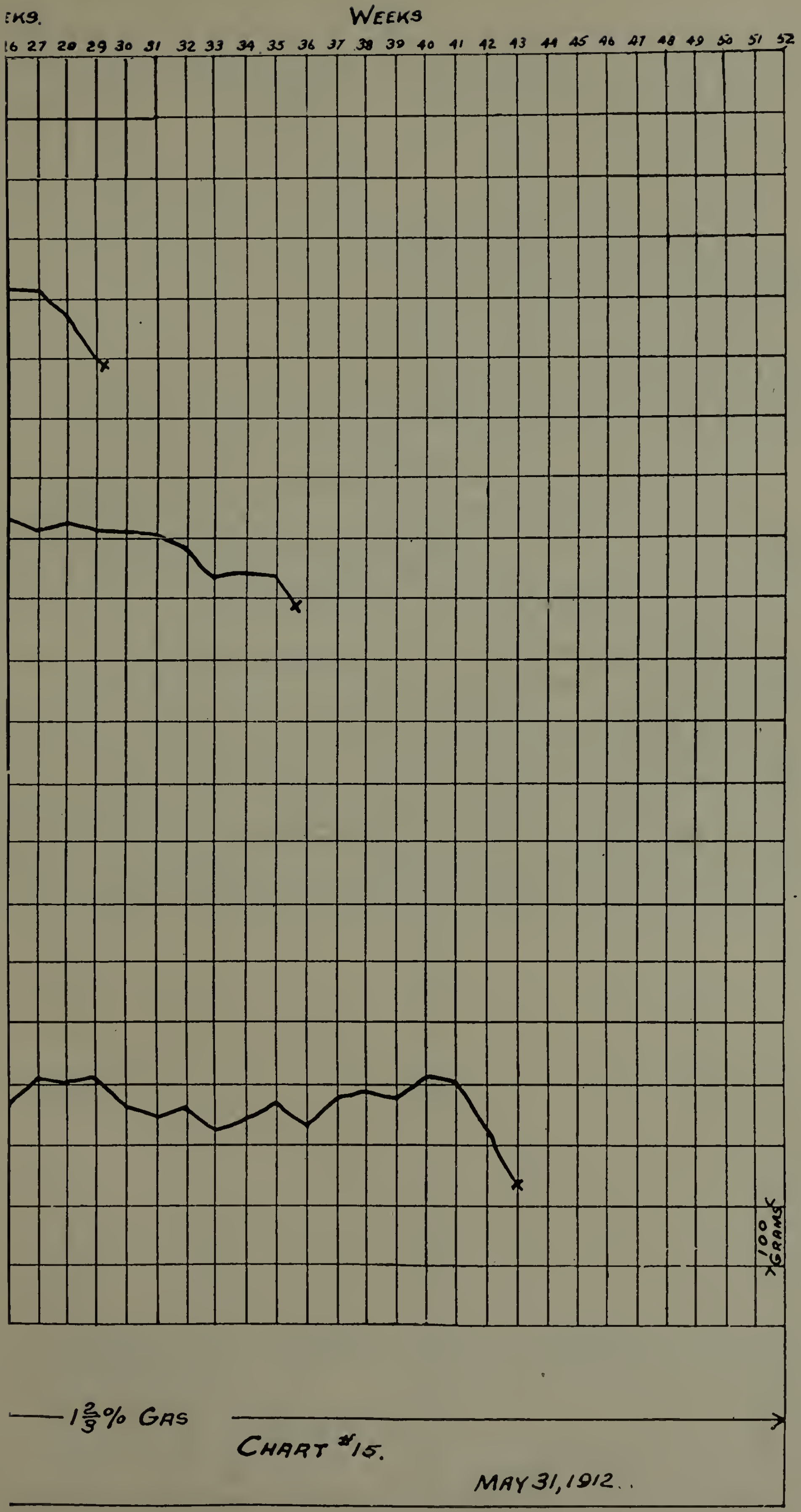
THESE CURVES WOULD SEEM TO INDICATE THAT THE INOCULATION OF INTERMEDIATE STRENGTH IS THE MOST DESTRUCTIVE.

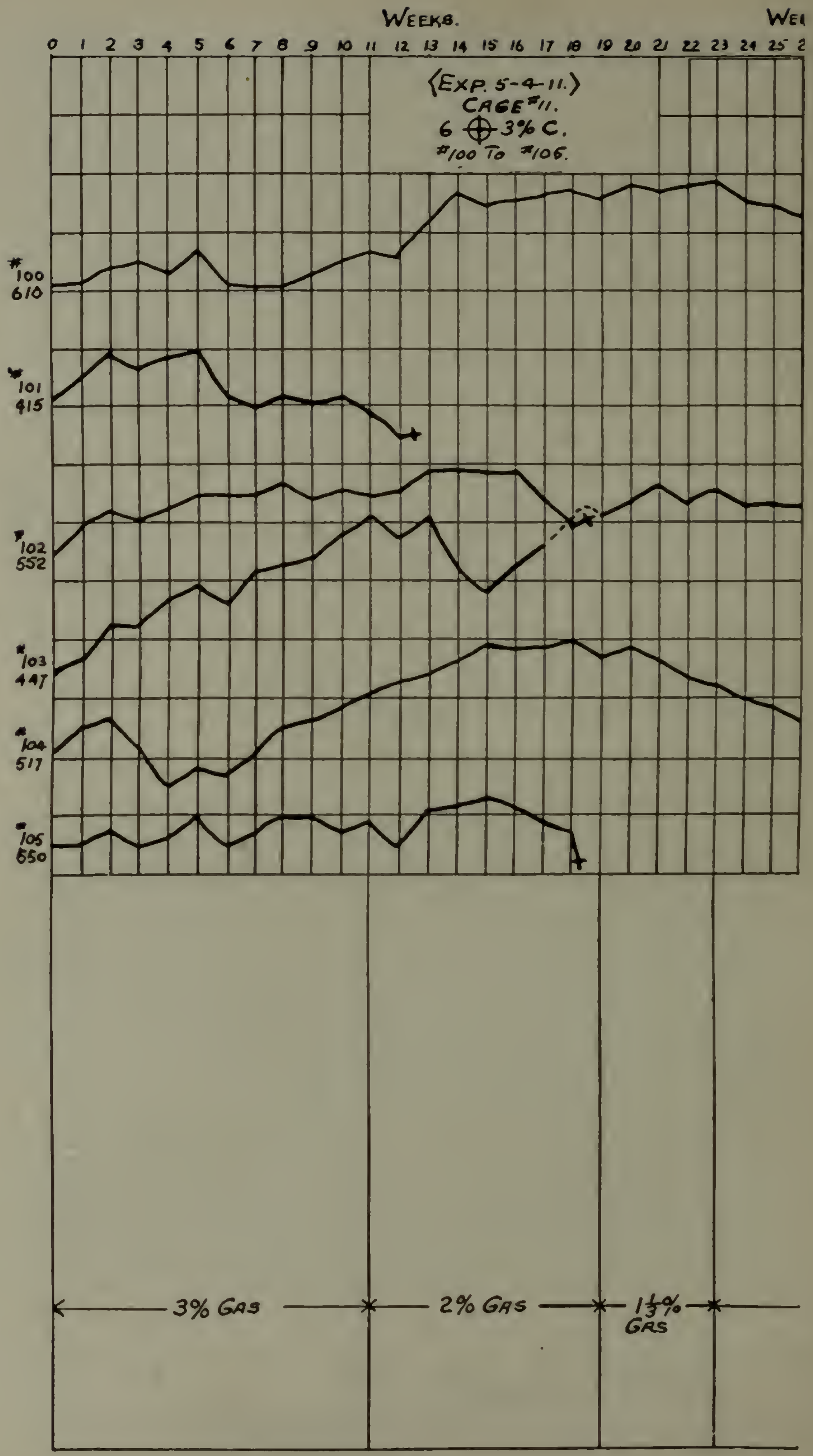
— $1\frac{2}{3}$% GAS →

CHART #14.

MAY 31, 1912.


WEEKS.
WEI
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 2
EXP. 5-4-11.
CAGE #10
10 ⊖ 3% B.
#90 TO #99.
#90 716
#91 609
#92 564
#93 674
#94 694
#95 743
#96 640
#97 640
#98 642
#99 810
NOTE REMARKABLE CURVE OF #99
3% GAS
2% GAS
1 1/3 % GAS


EKS.
WEEKS
6 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52
100 GRAMS
1⅔% GAS
CHART #15.
MAY 31, 1912.


WEEKS.
WE
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
⟨EXP. 5-4-11.⟩
CAGE #11.
6 ⊕ 3% C.
#100 TO #106.
#100
610
#101
415
#102
552
#103
447
#104
517
#105
550
3% GAS
2% GAS
1⅓%
GAS

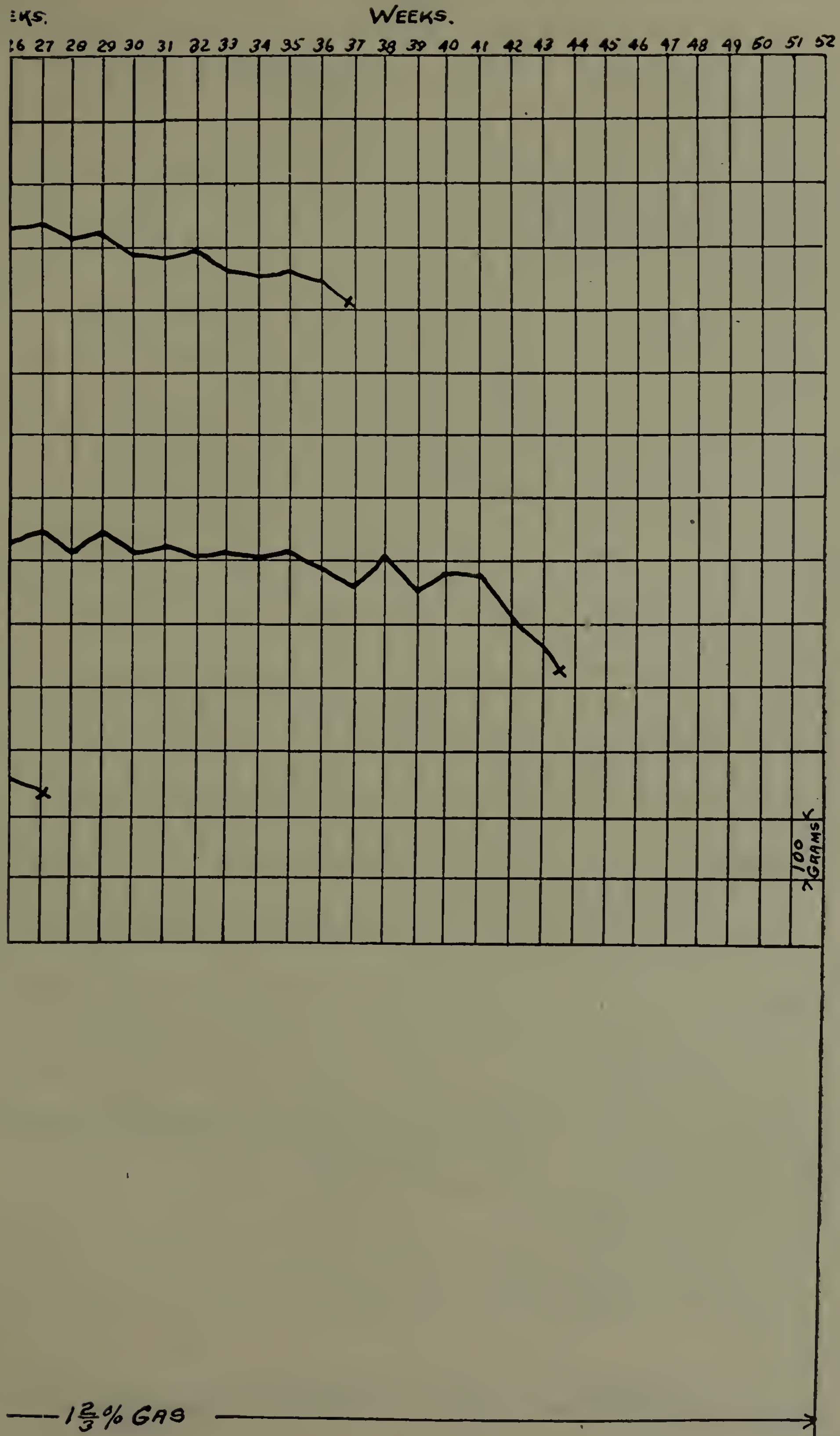
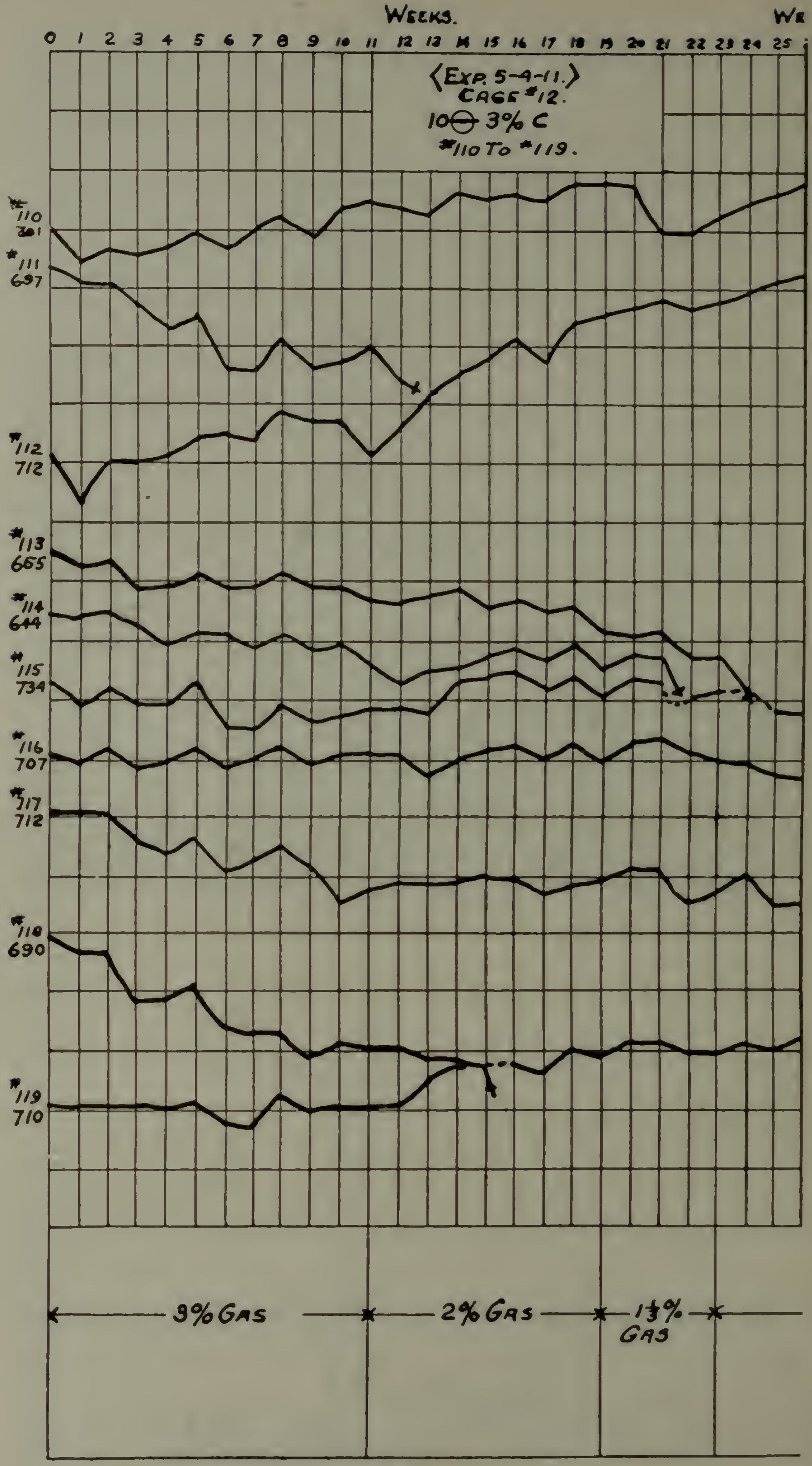
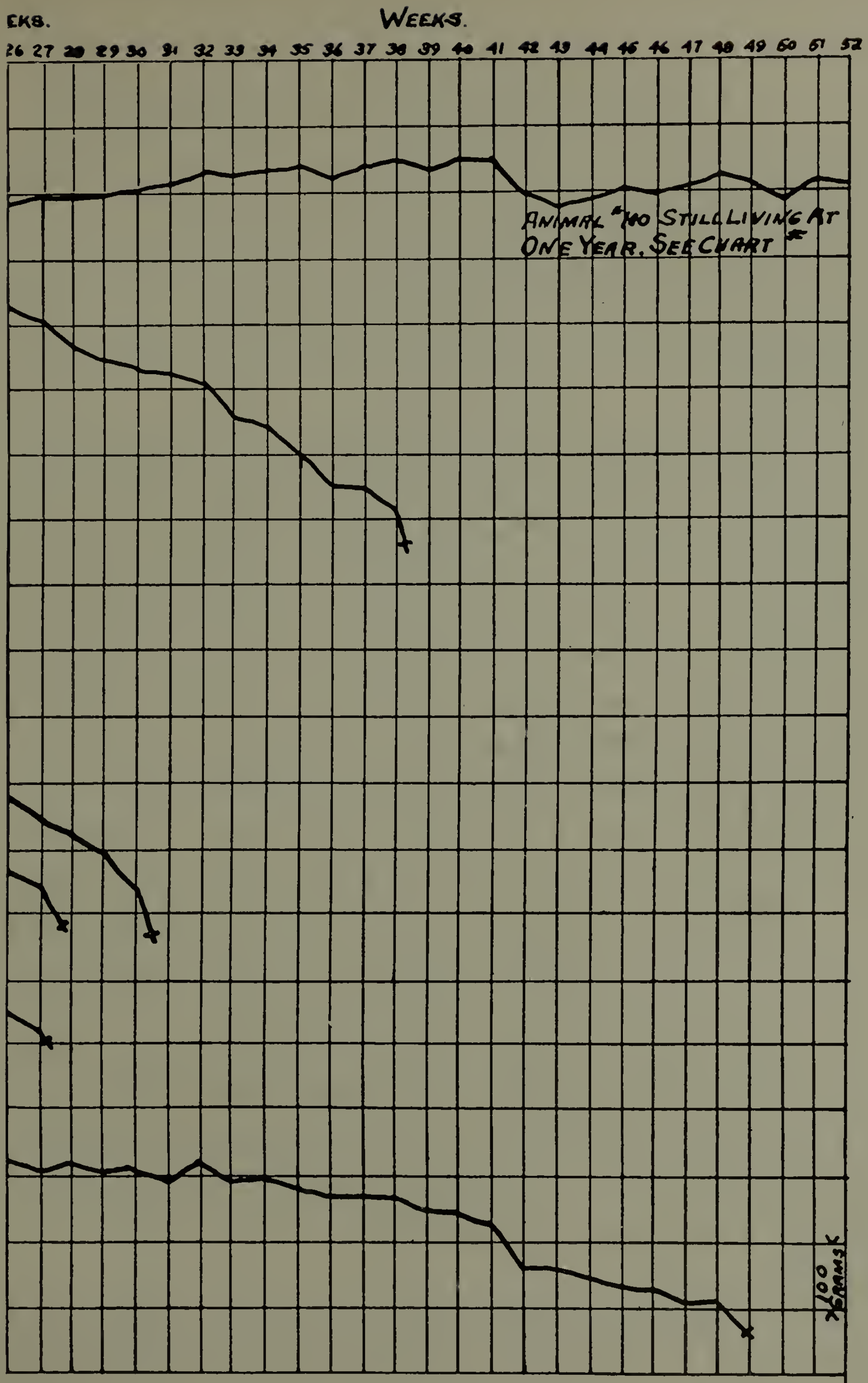


CHART #16.

MAY 31, 1912.


WEEKS.
WE
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
⟨EXP. 5-4-11.⟩
CAGE #12.
10⊖ 3% C
#110 TO #119.
#110
701
#111
697
#112
712
#113
655
#114
644
#115
734
#116
707
#117
712
#118
690
#119
710
3% GAS
2% GAS
1⅓%
GAS



1⅔% GAS →

CHART #17.

MAY 31, 1912.

before his inoculation had been of no value to him because he was destroyed by the germs as none of the others were.

Such a view is indeed superficial, for the truth of the matter is that the vital strength of oxidation enabled him to live on with all his organs attacked for a period more than twice as long as any other check animal.

We explain this matter in detail that you may appreciate, in the animals under treatment, how the strength given by the intensified oxygen they inhale enables them to live on through such periods of tubercular devastation as no check animal can stand.

We are now demonstrating *resistance* to tuberculosis, not *cure*, for our work is not done, but in all reason this far-reaching resistance in the most delicate animal known to the attack plainly foreshadows a wonderful hope when applied to the strongest animal, man.

We generally think of tuberculosis as attacking the lungs as the most vulnerable point, but when we look upon our actual record, which has no room for opinions, as it is based solely on facts, we find that of the forty-one animals only seven are diseased in the lungs; of these seven, five are lightly affected, one strongly involved and one with the lungs destroyed as shown by caseation.

The column depicting the changes of weight shows very heavy losses for all of these animals. If we take the fourth animal from the top, No. 205, with his loss of four hundred and thirty-five grams in two weeks, we have the result of an awful assault and perhaps a realization of how powerful oxygen must be to even leave its mark upon such a conflict.

Glance back to the weight curves of the ⊕ animals in two per cent. of the gas after inoculation (page 64) and again see intensified oxygen raise their weight a hundred grams or more in the same period that this one lost more than four hundred grams; can more conclusive evidence be given?

WEEKS.

0 4 8 12 16 20 24 28 32

No.	Glands Near Inoculation Point.	Glands General	Spleen.	Liver.	Lungs.	Change in Weight Grams.	Condition of Body.	Tubercular Healing Present
150	→ x	0	0	0	0	-149	M	0
200	→ x	0	0	0	0	-203	M	0
203	→ x	0	0	0	0	-145	M	0
205	→ x	0	0	0	0	-435	M	0
207	→ x	0	0	0	0	-161	M	0
209	→ x	0	0	0	0	-89	M	0
186	→ x		0	0	0	-255	M	0
160	xxx →	xxx	x	0	0	-231	M	●
166	xxx →	xxx	xx	x	0	-179	M	0
170	xxx →	xxx	xx	xx	0	-216	M	0
172	xx →	xx	xx	x	0	-242	M	0
180	xxx →		x	x	0	-278	M	0
187	xxx →	xxx	xx	x	0	-279	M	0
167	xxx →	xxx	xx	x	0	-301	M	0
173	xxx	→ xxx	xx	x	0	-167	M	0
180	xxx	→ xx	x	0	0	-350	M	0
188	xx	→ xx	xx	x	0	-303	M	0
190	xx	→ xxx	x	0	0	-188	M	0
201	xx	→ xxx	xx	0	0	-165	M	0
204	xxx	→ xx	x	x	0	-413	M	0
152	xxx	→ xxx	xx	xx	x	-189	M	0
163	xxx	→ xx	xx	xx	0	-250	M	0
165	xxx	→ xxx	xx	xx	0	-274	M	0
168	xxx	→ xxx	xx	x	0	-390	M	0
183	xxx	→ xxx	xx	xx	0	-277	M	0
191	xx	→ xx	xx	xx	x	-162	M	0
208	xxx	→ xx	xx	xx	x	-264	M	0
161		→ xxx	xx	x	xx	-198	M	0
162	xxx	→ xxx	x	x	0	-429	M	0
169	xxx	→	xx	xx	0	-275	M	0
181	xx	→ xxx	xx	x	0	-235	M	0
182	xxx	→ xxx	xx	x	0	-354	M	0
184	x	→ xxx	xx	x	0	-410	M	0
189		→ xxx	x	0	0	-357	M	0
192	xx	→ xxx	x	x	0	-180	M	0
193	xxx	→ xxx	x	0	0	-179	M	0
206	xx	→ xxx	x	0	0	-402	M	●
161	xxx	→ xxx	xx	x	x	-301	M	0
164	xxx	→ xxx	xx	x	x	-336	M	0
202	xxx	xxx →	xx	x	0	-177	M	0
171	xxx	xxx	xxx	xxx	→ xxx	-273	M	0

⟨EXPERIMENT 5-4-11.⟩

AUTOPSIES OF ALL CHECK ANIMALS EXCEPTING NUTRITIVE OXIDATION SECTION.

→ LIFE LINE
1/8" TO 1 WEEK.

x = ORGAN INVOLVED
xx = ORGAN LARGELY INVOLVED.
xxx = CASEATION PRESENT.
0 = ORGAN NOT INVOLVED.
M = BODY EMACIATED.

CHART NO. 18

JUNE, 1912

Turning from the autopsies of the check animals, we will take up the ones of those placed under the treatment, starting with chart no. 19, page 93.

We see at once that as the lives stretch out the tubercular destruction increases, as the germs have had more time in which to do their work. We find, of course, no animals that died within two weeks; or for that matter, within two months, the first death taking place in eleven weeks. Note that the loss of weight is less and that there are several cases of increased weight.

At the end of the record are certain notably good animals; we have marked them to show whether they were O plus or O minus. There are nine of these specially notable cases and seven of the nine are the ⊕.

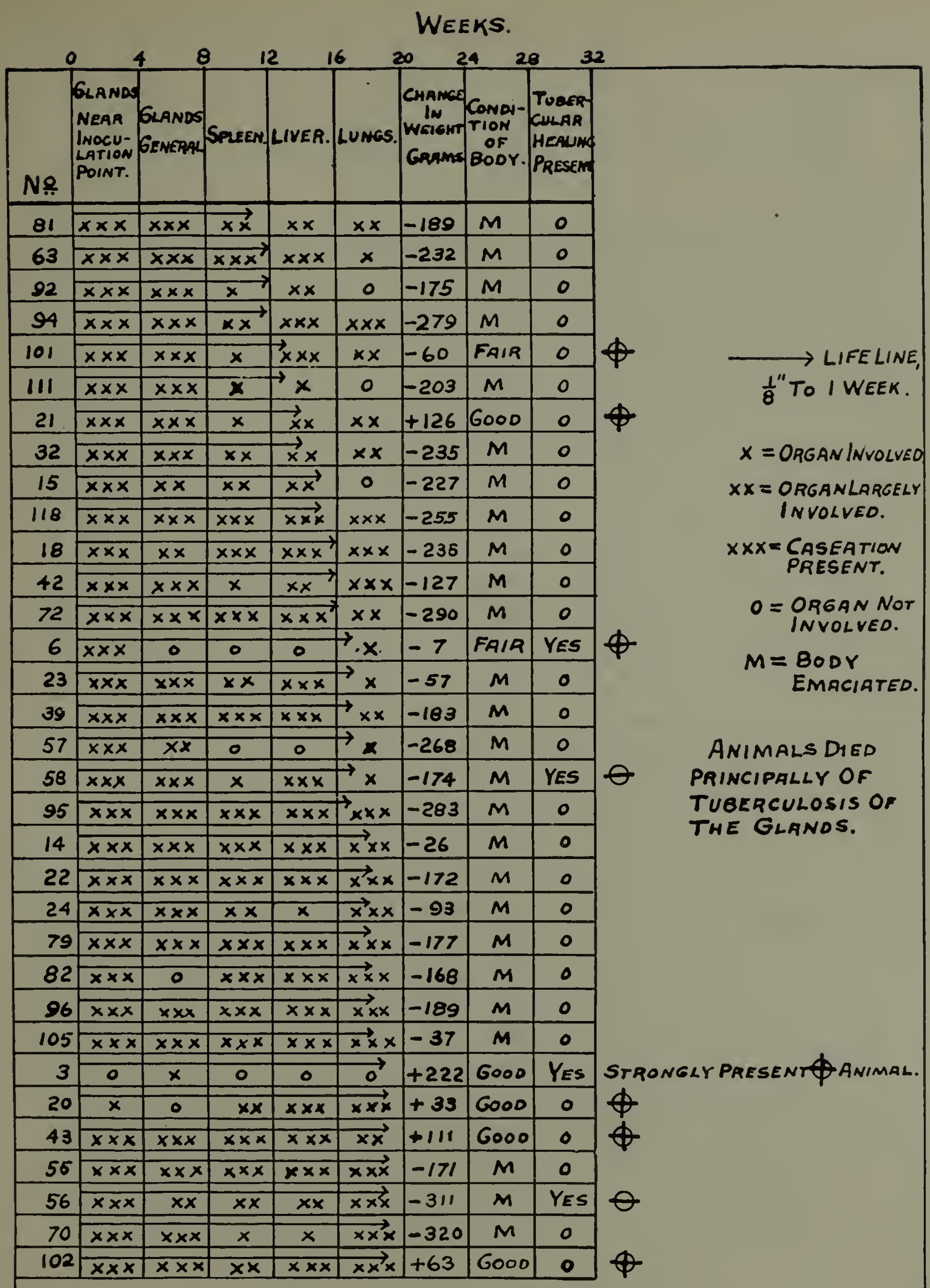
Take the case of animal No. 3, the seventh from the bottom; surely this is something more than resistance. The animal weighed over two hundred grams more than when inoculated, tubercular healing was strongly present and the only evidence of the disease left was a very light involvement of his glands.

Note the other cases of tubercular healing for they mean much, *for of all the hundreds of animals we have inoculated, we have never found a single case of tubercular healing in a check animal.*

Charts no. 20 and no. 21, pages 94 and 95, take us through all the rest of the animals placed under the treatment and show their lives stretching out in strong contrast to the long-since-dead check animals until we reach the statement that there are special drawings and reports on *the animals living more than a year, and notice in passing that all the animals on the last drawing,* chart no. 21, lived more than six months.

On folding chart facing page 96 we place the drawing experiment 5-4-11—Animals Living More Than One Year.

This drawing is doubly important, as it not only depicts the his-



No.	Glands Near Inoculation Point.	Glands General	Spleen.	Liver.	Lungs.	Change In Weight Grams	Condition of Body.	Tubercular Healing Present	
81	xxx	xxx	xx	xx	xx	-189	M	0	
63	xxx	xxx	xxx	xxx	x	-232	M	0	
92	xxx	xxx	x	xx	0	-175	M	0	
94	xxx	xxx	xx	xxx	xxx	-279	M	0	
101	xxx	xxx	x	xxx	xx	-60	Fair	0	⊕
111	xxx	xxx	x	x	0	-203	M	0	
21	xxx	xxx	x	xx	xx	+126	Good	0	⊕
32	xxx	xxx	xx	xx	xx	-235	M	0	
15	xxx	xx	xx	xx	0	-227	M	0	
118	xxx	xxx	xxx	xxx	xxx	-255	M	0	
18	xxx	xx	xxx	xxx	xxx	-236	M	0	
42	xxx	xxx	x	xx	xxx	-127	M	0	
72	xxx	xxx	xxx	xxx	xx	-290	M	0	
6	xxx	0	0	0	x	- 7	Fair	Yes	⊕
23	xxx	xxx	xx	xxx	x	-57	M	0	
39	xxx	xxx	xxx	xxx	xx	-183	M	0	
57	xxx	xx	0	0	x	-268	M	0	
58	xxx	xxx	x	xxx	x	-174	M	Yes	⊖
95	xxx	xxx	xxx	xxx	xxx	-283	M	0	
14	xxx	xxx	xxx	xxx	xxx	-26	M	0	
22	xxx	xxx	xxx	xxx	xxx	-172	M	0	
24	xxx	xxx	xx	x	xxx	- 93	M	0	
79	xxx	xxx	xxx	xxx	xxx	-177	M	0	
82	xxx	0	xxx	xxx	xxx	-168	M	0	
96	xxx	xxx	xxx	xxx	xxx	-189	M	0	
105	xxx	xxx	xxx	xxx	xxx	- 37	M	0	
3	0	x	0	0	0	+222	Good	Yes	
20	x	0	xx	xxx	xxx	+ 33	Good	0	⊕
43	xxx	xxx	xxx	xxx	xx	+111	Good	0	⊕
55	xxx	xxx	xxx	xxx	xxx	-171	M	0	
56	xxx	xx	xx	xx	xxx	-311	M	Yes	⊖
70	xxx	xxx	x	x	xxx	-320	M	0	
102	xxx	xxx	xx	xxx	xxx	+63	Good	0	⊕

STRONGLY PRESENT ⊕ ANIMAL.

⟶ LIFE LINE, $\frac{1}{8}$" TO 1 WEEK.

X = ORGAN INVOLVED

XX = ORGAN LARGELY INVOLVED.

XXX = CASEATION PRESENT.

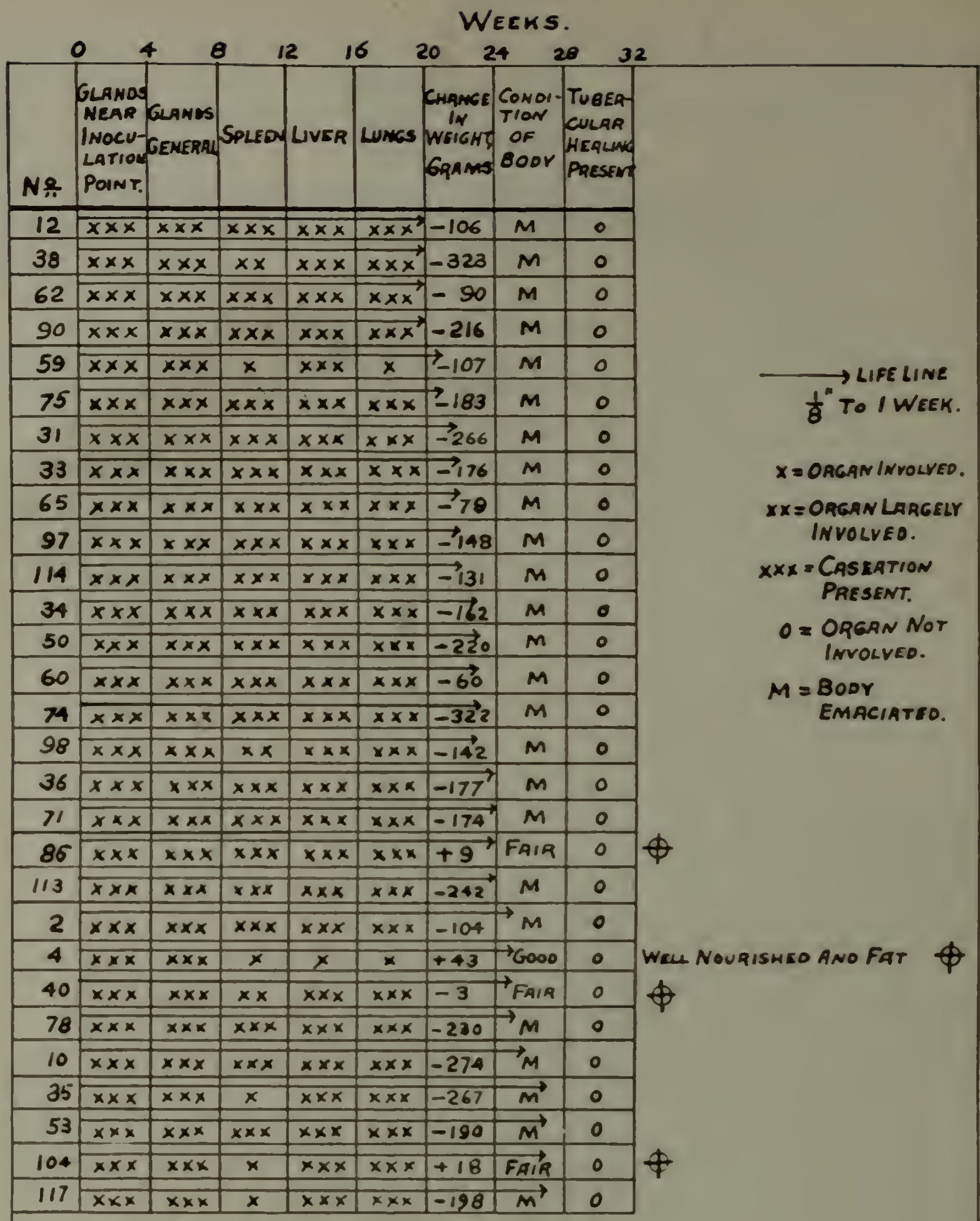
0 = ORGAN NOT INVOLVED.

M = BODY EMACIATED.

ANIMALS DIED PRINCIPALLY OF TUBERCULOSIS OF THE GLANDS.

⟨EXPERIMENT 5-4-11.⟩
AUTOPSIES OF ANIMALS UNDER TREATMENT.
CHART NO. 19.

JUNE 1912.



Nº.	Glands near Inoculation Point.	Glands General	Spleen	Liver	Lungs	Change in Weight Grams	Condition of Body	Tubercular Healing Present	
12	xxx	xxx	xxx	xxx	xxx	−106	M	0	
38	xxx	xxx	xx	xxx	xxx	−323	M	0	
62	xxx	xxx	xxx	xxx	xxx	− 90	M	0	
90	xxx	xxx	xxx	xxx	xxx	−216	M	0	
59	xxx	xxx	x	xxx	x	−107	M	0	
75	xxx	xxx	xxx	xxx	xxx	−183	M	0	
31	xxx	xxx	xxx	xxx	xxx	−266	M	0	
33	xxx	xxx	xxx	xxx	xxx	−176	M	0	
65	xxx	xxx	xxx	xxx	xxx	−78	M	0	
97	xxx	xxx	xxx	xxx	xxx	−148	M	0	
114	xxx	xxx	xxx	xxx	xxx	−131	M	0	
34	xxx	xxx	xxx	xxx	xxx	−162	M	0	
50	xxx	xxx	xxx	xxx	xxx	−220	M	0	
60	xxx	xxx	xxx	xxx	xxx	−60	M	0	
74	xxx	xxx	xxx	xxx	xxx	−322	M	0	
98	xxx	xxx	xx	xxx	xxx	−142	M	0	
36	xxx	xxx	xxx	xxx	xxx	−177	M	0	
71	xxx	xxx	xxx	xxx	xxx	−174	M	0	
86	xxx	xxx	xxx	xxx	xxx	+9	Fair	0	⊕
113	xxx	xxx	xxx	xxx	xxx	−242	M	0	
2	xxx	xxx	xxx	xxx	xxx	−104	M	0	
4	xxx	xxx	x	x	x	+43	Good	0	Well Nourished And Fat ⊕
40	xxx	xxx	xx	xxx	xxx	− 3	Fair	0	⊕
78	xxx	xxx	xxx	xxx	xxx	−230	M	0	
10	xxx	xxx	xxx	xxx	xxx	−274	M	0	
35	xxx	xxx	x	xxx	xxx	−267	M	0	
53	xxx	xxx	xxx	xxx	xxx	−190	M	0	
104	xxx	xxx	x	xxx	xxx	+18	Fair	0	⊕
117	xxx	xxx	x	xxx	xxx	−198	M	0	

⟶ LIFE LINE $\frac{1}{8}''$ TO 1 WEEK.

x = ORGAN INVOLVED.

xx = ORGAN LARGELY INVOLVED.

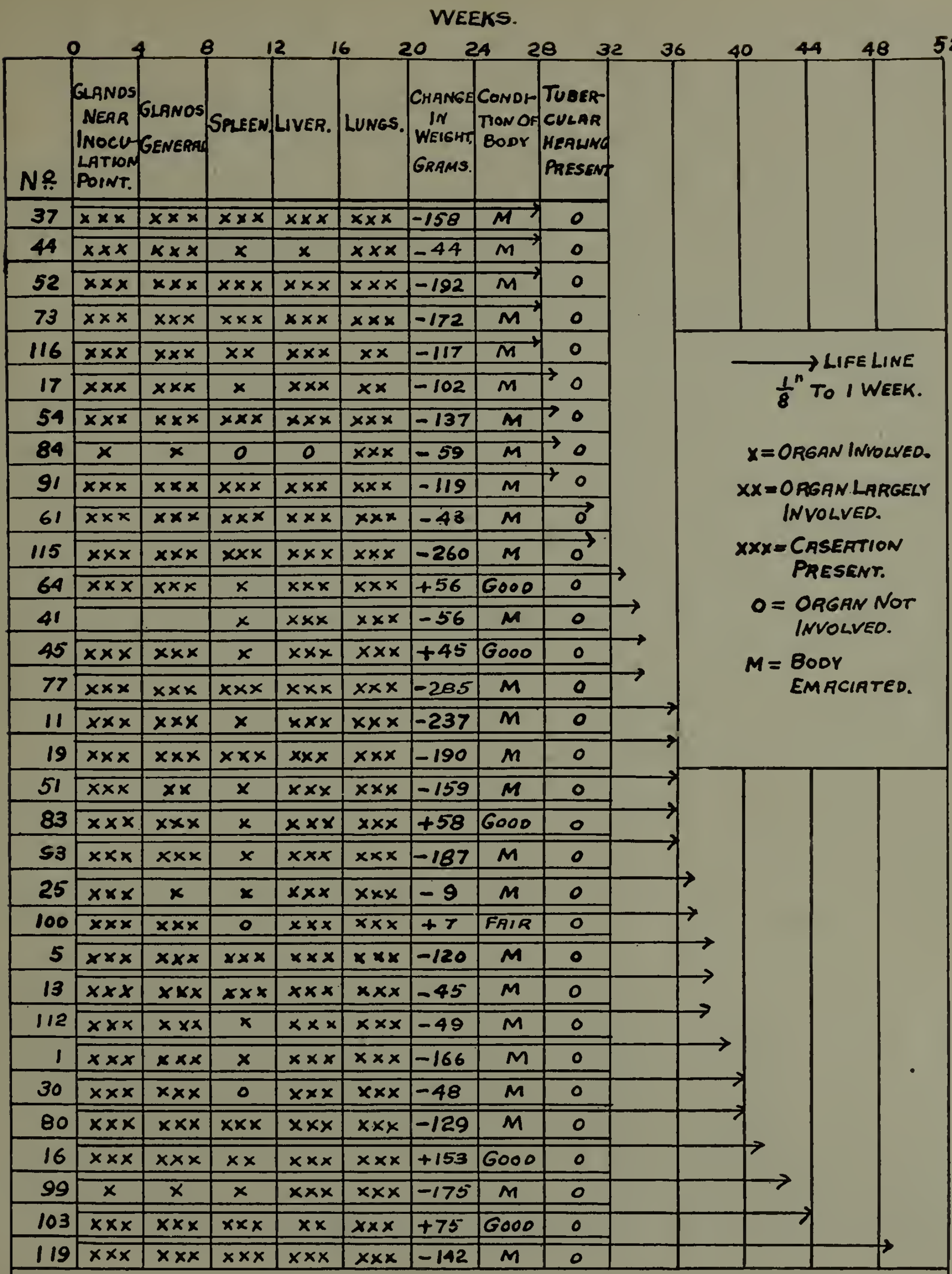
xxx = CASEATION PRESENT.

0 = ORGAN NOT INVOLVED.

M = BODY EMACIATED.

〈EXPERIMENT 5-4-11.〉
AUTOPSIES OF ANIMALS
UNDER TREATMENT.
CHART No. 20

JUNE, 1912.



No.	Glands Near Inoculation Point.	Glands General	Spleen.	Liver.	Lungs.	Change in Weight, Grams.	Condition of Body	Tubercular Healing Present
37	xxx	xxx	xxx	xxx	xxx	-158	M	o
44	xxx	xxx	x	x	xxx	-44	M	o
52	xxx	xxx	xxx	xxx	xxx	-192	M	o
73	xxx	xxx	xxx	xxx	xxx	-172	M	o
116	xxx	xxx	xx	xxx	xx	-117	M	o
17	xxx	xxx	x	xxx	xx	-102	M	o
54	xxx	xxx	xxx	xxx	xxx	-137	M	o
84	x	x	o	o	xxx	-59	M	o
91	xxx	xxx	xxx	xxx	xxx	-119	M	o
61	xxx	xxx	xxx	xxx	xxx	-48	M	o
115	xxx	xxx	xxx	xxx	xxx	-260	M	o
64	xxx	xxx	x	xxx	xxx	+56	Good	o
41			x	xxx	xxx	-56	M	o
45	xxx	xxx	x	xxx	xxx	+45	Good	o
77	xxx	xxx	xxx	xxx	xxx	-285	M	o
11	xxx	xxx	x	xxx	xxx	-237	M	o
19	xxx	xxx	xxx	xxx	xxx	-190	M	o
51	xxx	xx	x	xxx	xxx	-159	M	o
83	xxx	xxx	x	xxx	xxx	+58	Good	o
53	xxx	xxx	x	xxx	xxx	-187	M	o
25	xxx	x	x	xxx	xxx	-9	M	o
100	xxx	xxx	o	xxx	xxx	+7	Fair	o
5	xxx	xxx	xxx	xxx	xxx	-120	M	o
13	xxx	xxx	xxx	xxx	xxx	-45	M	o
112	xxx	xxx	x	xxx	xxx	-49	M	o
1	xxx	xxx	x	xxx	xxx	-166	M	o
30	xxx	xxx	o	xxx	xxx	-48	M	o
80	xxx	xxx	xxx	xxx	xxx	-129	M	o
16	xxx	xxx	xx	xxx	xxx	+153	Good	o
99	x	x	x	xxx	xxx	-175	M	o
103	xxx	xxx	xxx	xx	xxx	+75	Good	o
119	xxx	xxx	xxx	xxx	xxx	-142	M	o

→ Life Line
$\frac{1}{8}$" To 1 Week.

x = Organ Involved.
xx = Organ Largely Involved.
xxx = Caseation Present.
o = Organ Not Involved.
M = Body Emaciated.

See Special Drawings And Reports On Animals Living Over One Year.

Nutritive Oxidation Section Of Experiment In Separate Report.

⟨Experiment 5-4-11.⟩
Autopsies of Animals
Under Treatment.
Chart No. 21.

June, 1912.

tory of our three longest-lived animals, but also shows the different changes made in our efforts to solve the problem that prevented us from raising the voltage to its previous maximum.

We will consider the weight curves of the animals first.

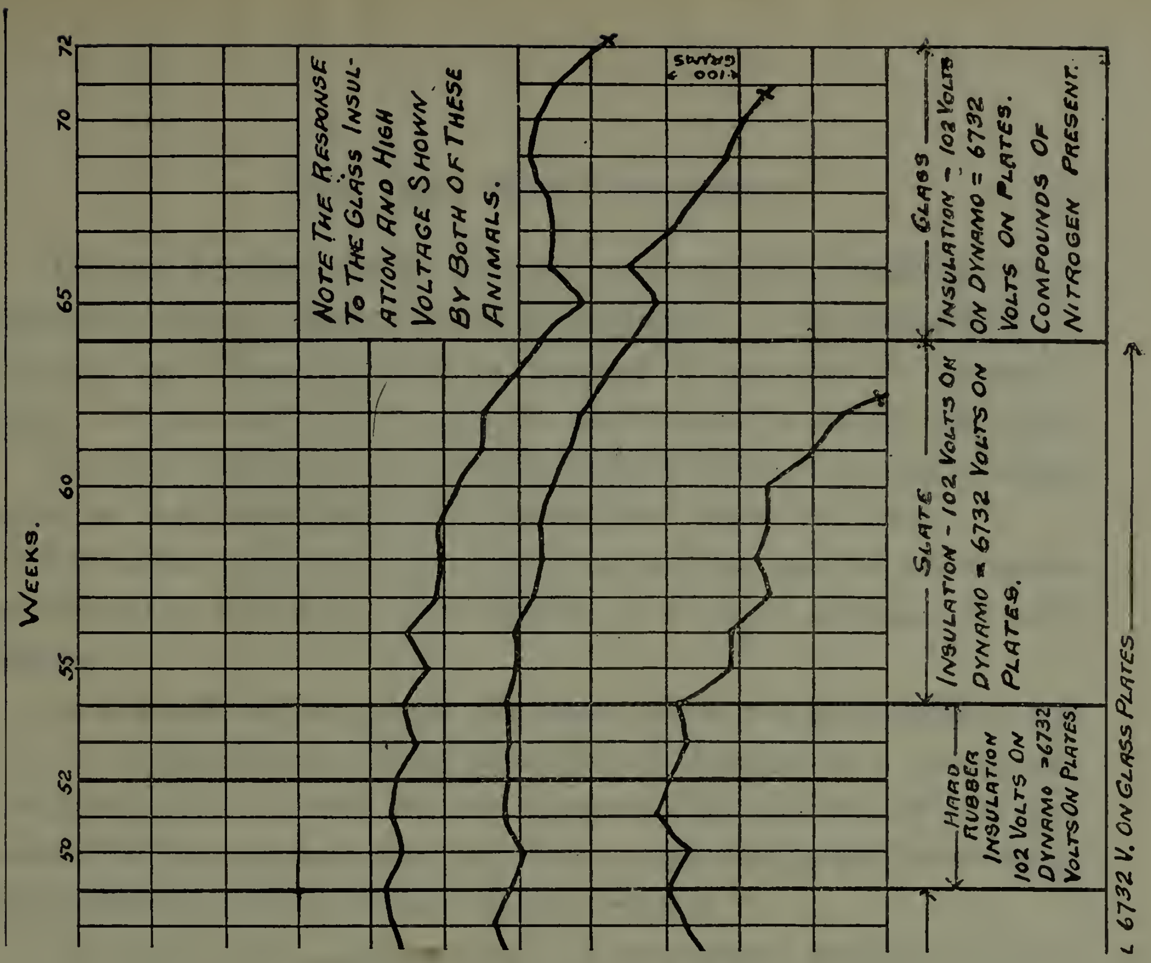
Animal No. 76, ⊖, a natural animal weighing six hundred and fifteen grams when inoculated. After inoculation he was carried in three per cent. of the gas for eleven weeks, the balance of the time he was in two per cent. of gas. Six weeks after inoculation, he commenced to gain strongly. The apex of his curve is reached at twenty-seven weeks, when he weighed eight hundred and forty grams. At this time the steadily increasing hordes of the tubercle bacilli commenced to overpower him and his weight curve gradually fell, but the strength of oxidation maintained him for almost a year after he reached his greatest weight.

At forty-one weeks after inoculation the disease struck him a heavy blow and he lost more than one hundred grams, but he rose from this blow and continued his hopeless struggle for twenty-nine weeks before he died.

It would seem that no better demonstration of resistance to tuberculosis could be given than that shown by this animal and his two mates, and we will leave these interesting records to be followed with reason, step by step, from their inoculation to their long-deferred fate; so long deferred as to cause us to say that the animals probably lived their ordinary life time, for these animals were at least two years old at the time of their death.

On this drawing is the record of the steps taken which eventually solved the insulation phase of our problem.

For forty-nine weeks after the inoculation, we failed in every effort to raise the voltage to the point we wished to attain, but at this time we replaced the glass with sheets of hard rubber and maintained our full voltage for five weeks.



NOTE THE RESPONSE TO THE GLASS INSULATION AND HIGH VOLTAGE SHOWN BY BOTH OF THESE ANIMALS.

The gas we made did not impress us as right, for while giving all chemical tests, it seemed to lack something. No compounds of nitrogen were found and the gas seemed to have lost its "snappy" odor. At the end of five weeks the effort ended in failure and a fire.

We then insulated with carefully picked sheets of ordinary roofing slate, as they were hard and vitreous and could not burn.

This effort lasted for ten weeks, but still the gas did not impress us favorably and again all evidence of nitrogen compounds were lacking.

At the end of ten weeks the slate failed and our problem was solved, as the sheets of hard slate had all changed to a soft chalky condition and it at once became apparent that our trouble had been caused by the demonstrated fact that no material could *permanently* withstand the strain we had placed upon it.

The hard rubber had burned up in five weeks, the slate had become soft in ten, the glass plates did not show any sign excepting the fact that they broke into pieces, one at a time.

Our mistake had been that we would replace the broken plate and leave thirty-odd old ones in the cell. We rebuilt all our cells with new glass plates and when the strain commenced to show itself by frequent breakdowns we replaced all plates with new ones and have since had no serious trouble.

Compounds of nitrogen came back with the use of the new glass plates and the full voltage.

Turning once more to the curves of the animals, we see their very interesting response, as shown by a positive increase in weight in both at the sixty-fifth week.

Of course it was too late to change the result, but we were again in control of at least one vital factor and could proceed with our problem.

While this experiment does not, in our judgment, attain the very high plane of the January and the August Experiments, yet it far outreaches the November Experiment and it also carries, in at least some of its animals, each and every characteristic of the first two experiments, except the general character of the weight curves; even tubercular healing is repeatedly found. The great distinction is that the curves just after inoculation are of a different character from either the January or the August ones. In the two first experiments the animals lost weight heavily in the period just after inoculation, say four to five weeks, while the previously oxidized ones in this experiment rise strongly as if the inoculation had been stimulating to them; they fairly leap forward.

Embraced in these distinctions is what we call the character of a weight curve and the writer believes it may count for far more than the mere weight changes, for it may well be a distinct and vital mark of the process.

RESISTANCE TO TUBERCULOSIS ESTABLISHED

In order to present the evidence conclusively and tersely, we will draw comparison between all the check animals and all of the animals that have passed through the treatment, using only the length of their lives as a demonstrator. To accomplish this we will use for each animal a straight line one eighth of an inch long for every week the animal lived after being inoculated.

On page 100 we place the drawing CHART DEMONSTRATING RESISTANCE ESTABLISHED.

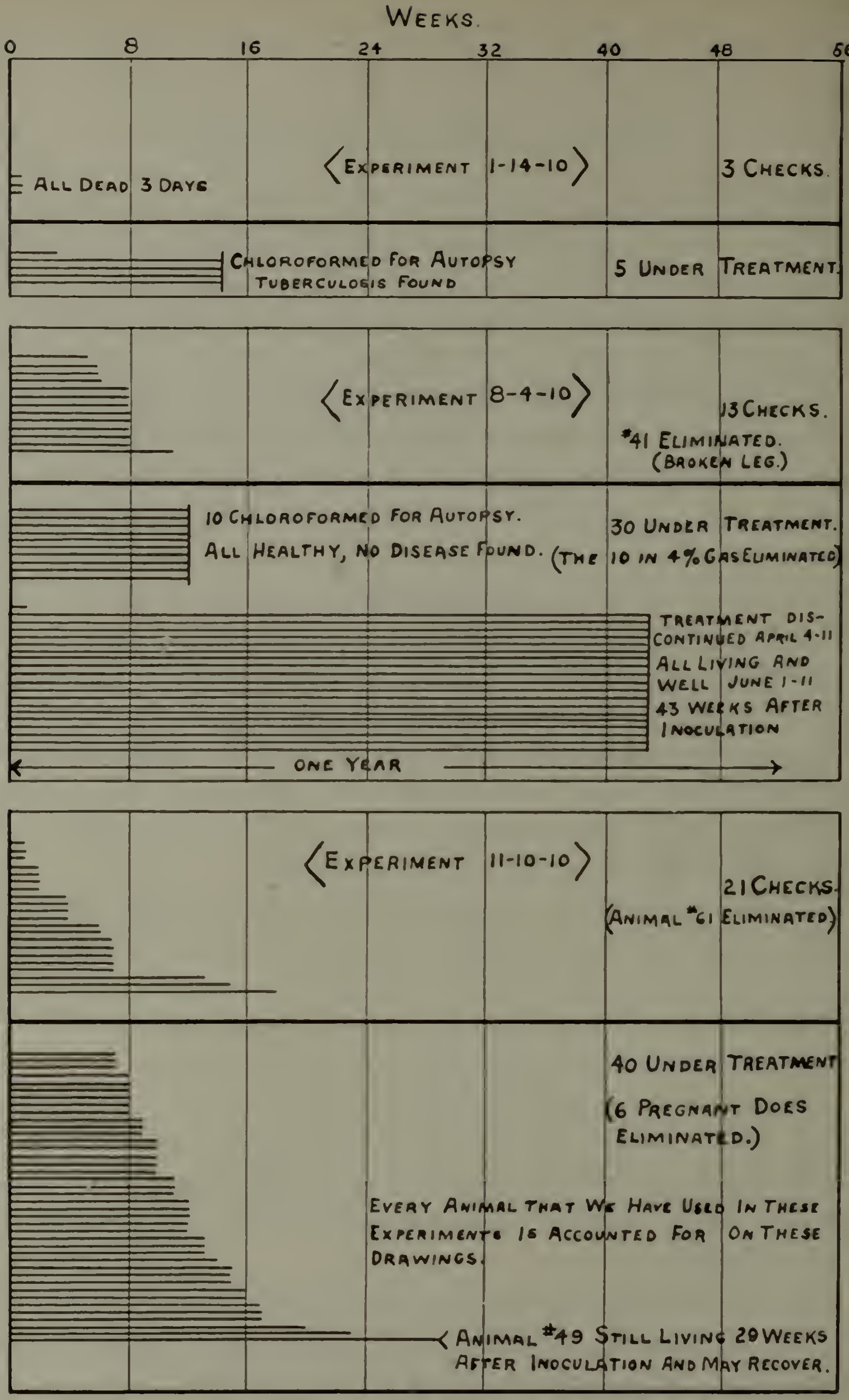
At the top of the drawing is the January Experiment (EXPERIMENT 1–14–10). The three check animals all died within four days. Of the five placed under the treatment, one is shown to have died in three weeks, while the other four did not die of the disease, but were chloroformed thirteen weeks after inoculation.

It will be noticed that a straight line is drawn perpendicularly at the end of these four life lines; when an aimal does not die of the disease we so close the lines and thus indicate the fact, while if it has died from the disease, the life line is left unmarked.

Next we reach the August Experiment (EXPERIMENT 8–4–10).

First we show the thirteen check animals, the longest lived being eleven weeks. Below this are the ten animals which had been placed in three per cent. of the gas, all living to be chloroformed at the end of three months. Certain animals are eliminated for reasons stated on the drawing.

Next we come to the twenty animals carried in one and in two per cent. of the gas. One died in about two weeks, which fact is shown by the short life line at the top of the cluster. The drawing



Every Animal That We Have Used In These Experiments Is Accounted For On These Drawings.

Chart Demonstrating Resistance Established.

$\frac{1}{8}$ Inch Laterally Equals 1 Week.

June 5, 1911.

states that the other nineteen lived for forty-three weeks but the drawing was made in June, 1911, and the animals lived in perfect health until their year was up in August and were then chloroformed.

This brings us to the November Experiment (EXPERIMENT 11–10–10). One is eliminated from the check animals, as it died within twenty-four hours after being inoculated.

Even in this experiment the animals under the treatment live distinctly longer than the check animals, the first death being in seven weeks as compared to one week for the check animals, and the whole culminating in animal No. 49 which lived forty-five weeks after inoculation.

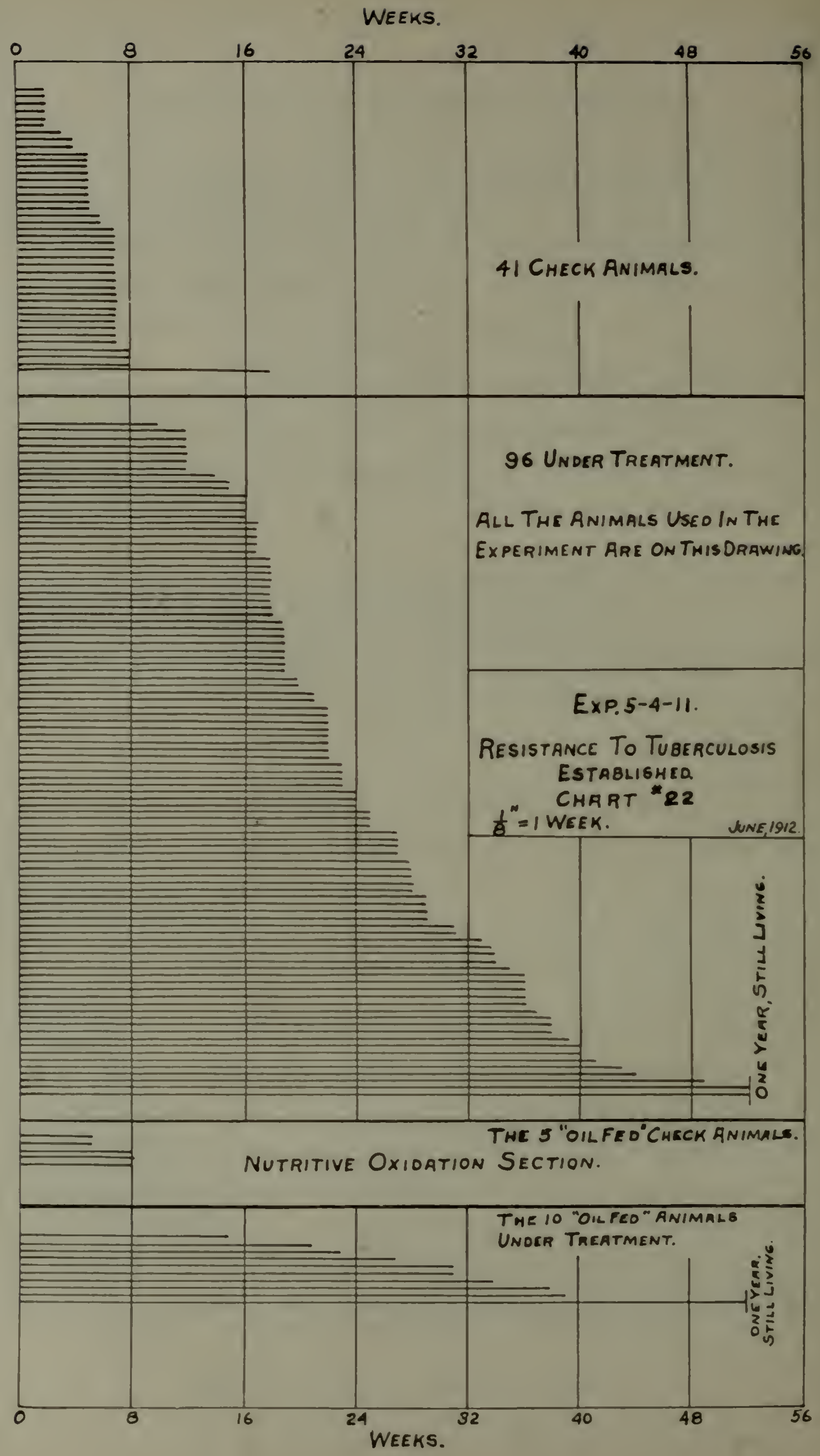
Note the statement on the drawing that every animal that we have used in these experiments is accounted for on the drawing. To use the happy phrase of Lord Mansfield, the case is so clear that it can only be obscured by argument.

Turning from this drawing, we place CHART NO. 22 from the First May Experiment on page 102. We do not intend to argue or explain with such self-evident facts before us as are shown on this drawing. Here are the life lines of one hundred and fifty-two animals; of the forty-six check animals, all but one are dead in eight weeks. *Of one hundred and six animals placed under the treatment, the first one died in ten weeks, the last one lived one year and twenty weeks.*

RESISTANCE TO TUBERCULOSIS ESTABLISHED; WHAT DOES IT MEAN?

It means that man now, after all these centuries of suffering, has at last placed his feet firmly upon that great intermediate stepping stone lying more than midway between the scourge and its removal. It further means that man so placed may only lose his power to throttle the disease by his own neglect.

It is not the writer, to whom the chances of life has brought this task, that speaks, for he is only the advocate of nature and nature's


WEEKS.
0
8
16
24
32
40
48
56
41 CHECK ANIMALS.
96 UNDER TREATMENT.
ALL THE ANIMALS USED IN THE EXPERIMENT ARE ON THIS DRAWING.
EXP. 5-4-11.
RESISTANCE TO TUBERCULOSIS ESTABLISHED.
CHART #22
1/8" = 1 WEEK.
JUNE, 1912.
ONE YEAR, STILL LIVING.
THE 5 "OIL FED" CHECK ANIMALS.
NUTRITIVE OXIDATION SECTION.
THE 10 "OIL FED" ANIMALS UNDER TREATMENT.
ONE YEAR, STILL LIVING.
0
8
16
24
32
40
48
56
WEEKS.

wonderful, dominant element OXYGEN in its changeable forms. It matters little to the world as to who has done this and we well understand the fact, but it matters much to the world if it is lost now that it is first found and so the question that these drawings ask of every intelligent reader is whether this process, with its promise of untold good for humanity, is to be allowed to be lost, for this question is largely in his hands.

CONCLUSIONS BASED UPON THE FIRST SECTION OF THE ANIMAL EXPERIMENTS

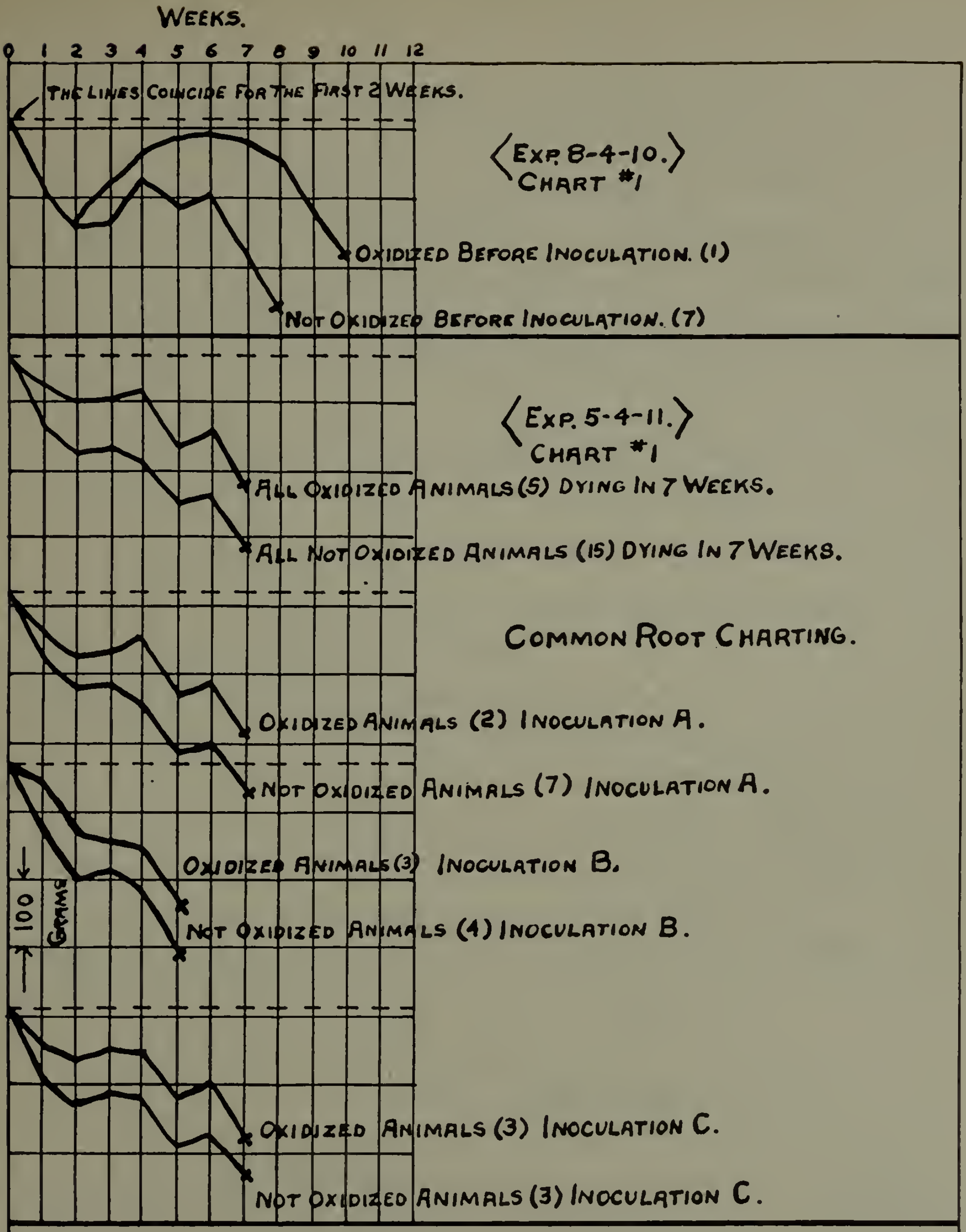
We hope that by this time the fact of the very close conformity in the records of the animals in any particular section of the experiments has been noted as, believing that we have proved our case by the large number of individual demonstrations presented, we shall, therefore, throughout the rest of our work largely use average curves.

The number of animals in the different curves will be found to vary in number and also to often not account for all the animals used in a section of the work. This is due to the fact that only animals dying at the same time can be placed in average curves, as otherwise the curves would be false.

To better explain this, if we had two animals, one weighing four hundred and fifty and the other six hundred and fifty grams, and during the week the lighter one died and the other lost fifty grams, we would have an actual loss of weight of fifty grams, but our weight line would rise fifty grams.

The drawings upon which we base our conclusions are five in number and cover principally the contrasts between the natural or unopposed disease as demonstrated by the records of the check animals, compared to the effects of the disease when opposed by intensified oxygen. The drawings are both simple and conclusive and are so important that we trust they will be studied closely, realizing that they are facts.

On page 105 we place the drawing CONCLUSIONS—CHECK ANIMALS, CHART NO. 1.



CONCLUSIONS.
CHECK ANIMALS.
CHART #1.

Jas. Todd. JULY, 1911.

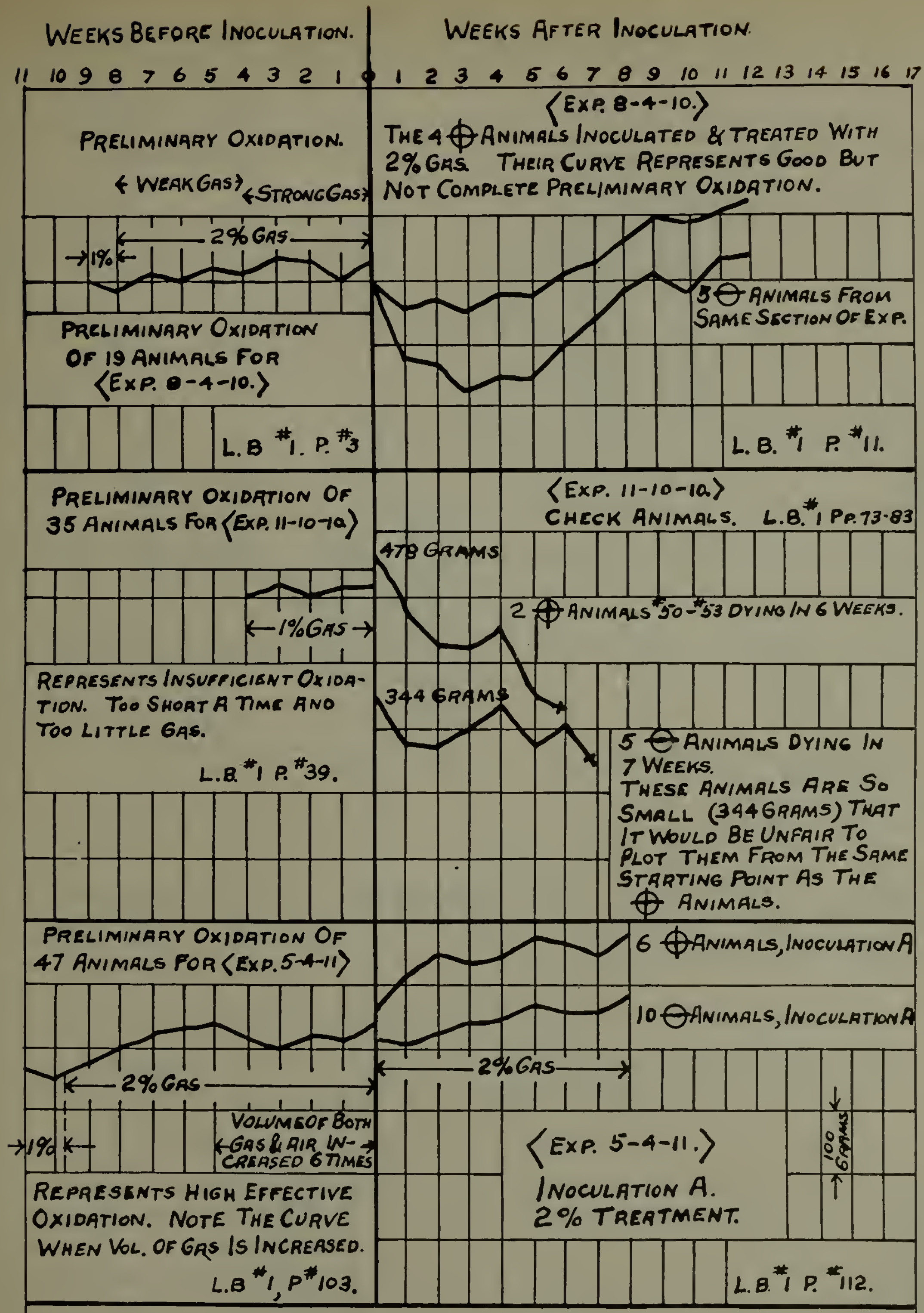
By common root charting we here compare the weight changes, from inoculation to death, of the oxidized before inoculation check animal, the ⊕, and the natural check animal, the ⊖. The only comment we make is to draw attention to the fact that in each case the top line is of the previously oxidized animal. *Here our reasoning in regard to the importance of oxygen in organic life is proved by the check animals.* This drawing covers all experiments in which previously oxidized check animals were used.

On page 107 we place the drawing Conclusions chart no. 2—Effect of Preliminary Oxidation.

On the left side of the drawing are the weight curves during preliminary oxidation. On the right section are the lines compared to natural animals after inoculation. All animals compared together were inoculated identically. This is an old drawing with a great deal of important information printed upon it and clearly shows the never varying good effects of preliminary oxidation when sufficiently carried out as compared to inefficient use of it as shown by the November Experiment (experiment 11–10–10). We leave these drawings to speak for themselves.

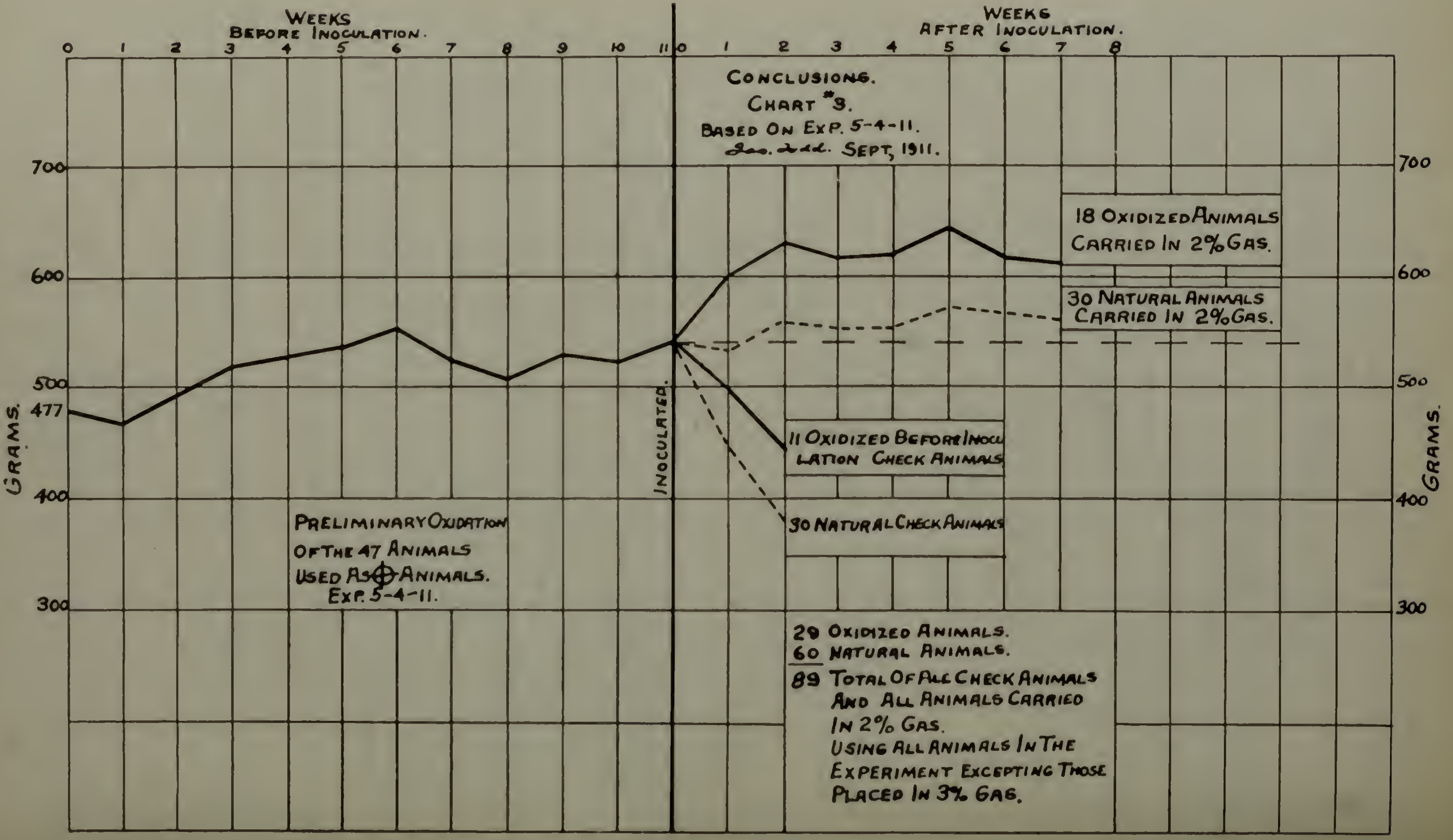
On page 108 we place the drawing Conclusions chart no. 3—Based on Experiment 5–4–11.

On this drawing we give first the weight changes during preliminary oxidation of all the animals oxidized previous to inoculation for the First May Experiment. The record after inoculation does not carry those animals inoculated and carried afterward in three per cent. of the intensified oxygen, as three per cent. of the gas was too depressive. All the animals carried in two per cent. of gas and all check animals are on the drawing; they number eighty-nine and the different divisions are all plainly marked. The natural animals are all represented by dotted lines, the oxidized ones by solid lines.



EFFECT OF PRELIMINARY OXIDATION.

CONCLUSIONS.
CHART #2
Geo. Dodd. JULY, 1911.


WEEKS
BEFORE INOCULATION.
WEEKS
AFTER INOCULATION.
0
1
2
3
4
5
6
7
8
9
10
11
0
1
2
3
4
5
6
7
8
CONCLUSIONS.
CHART #3.
BASED ON EXP. 5-4-11.
Jas. 2nd. SEPT, 1911.
700
600
500
477
400
300
GRAMS.
INOCULATED.
18 OXIDIZED ANIMALS CARRIED IN 2% GAS.
30 NATURAL ANIMALS CARRIED IN 2% GAS.
11 OXIDIZED BEFORE INOCULATION CHECK ANIMALS
30 NATURAL CHECK ANIMALS
PRELIMINARY OXIDATION OF THE 47 ANIMALS USED AS ⊕ ANIMALS. EXP. 5-4-11.
29 OXIDIZED ANIMALS.
60 NATURAL ANIMALS.
89 TOTAL OF ALL CHECK ANIMALS AND ALL ANIMALS CARRIED IN 2% GAS.
USING ALL ANIMALS IN THE EXPERIMENT EXCEPTING THOSE PLACED IN 3% GAS.

The results are so wonderful and so conclusive that we again leave them without comment, for explanation seems so inadequate a method to apply to such self-evident facts.

On page 110 we place the drawing CONCLUSIONS CHART NO. 4—BASED ON ALL THE ANIMALS FROM ALL THE EXPERIMENTS.

The drawing is so simple as to be self-explanatory, we having simply drawn all our work together and ignored all distinctions except the fact as to whether the animals were check animals or those carried through the process. Each line ends at the first death except for a very few animals eliminated to make the period charted practical.

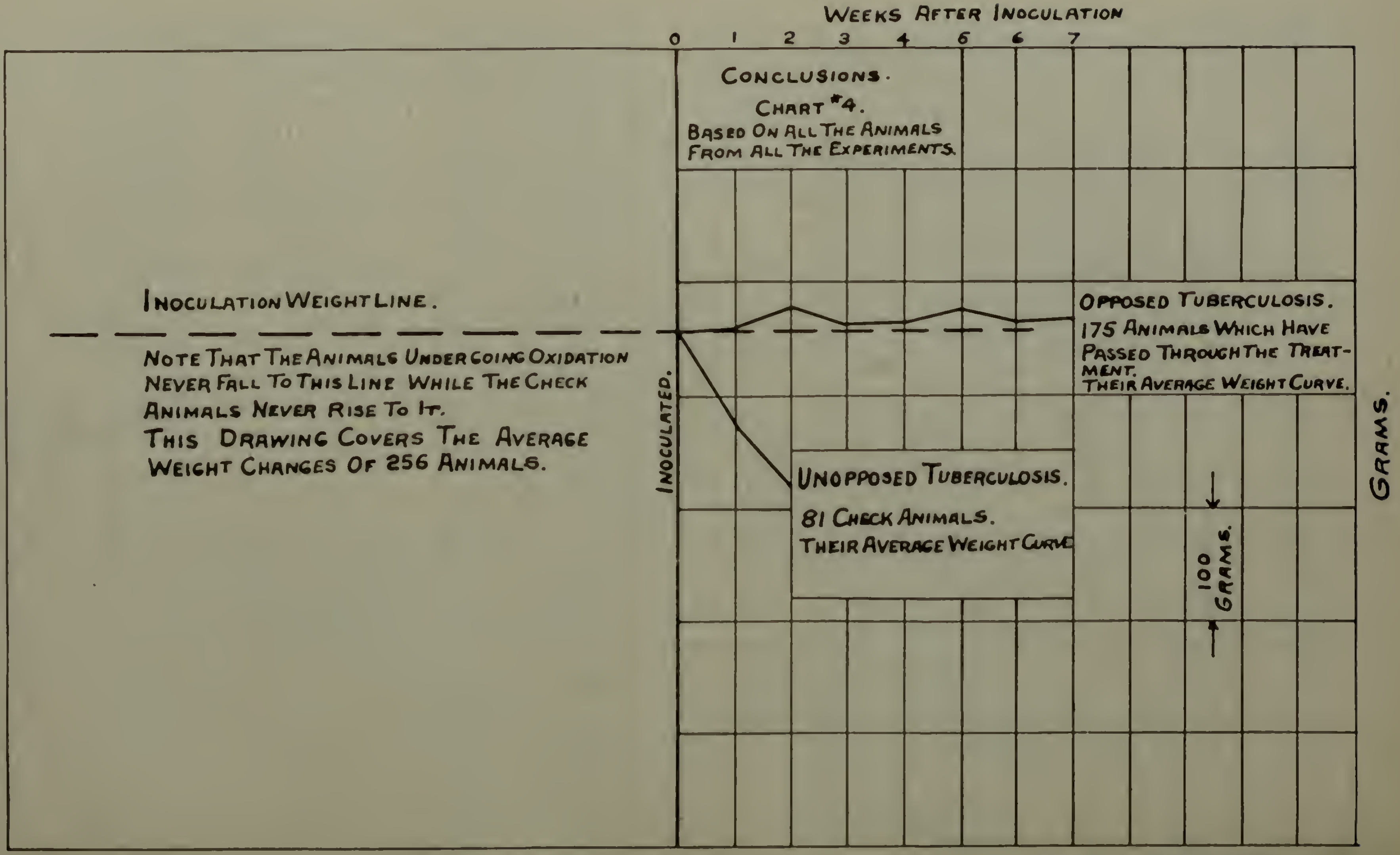
We ask careful note of the wording on the drawing and the fact that in this final test of our process we use more than two hundred and fifty animals.

Again we leave the demonstrated truth of the power of oxygen to your judgment and turn to the drawing CONCLUSIONS CHART NO. 5—THE DRAWING OF THE ELEVEN FACTS, page 111.

We have here demonstrated not animal records but rather the simple truths of the power of intensified oxygen, using a drawing for the purpose of emphasis. We have not brought our comparisons down to a question of exact time and effect, but have chosen to deal with the simple, true records of our work in a broad sense; neither have we undertaken to record all the truth because what we show is surely sufficient.

The only explanation necessary is as to facts Nine and Ten. When an animal is fighting for his life with the tubercle bacillus, he needs nature's opposing force to aid him and he can imbibe such quantities of intensified oxygen in his need, as if taken when the germ was not attacking him would quickly kill.

The eleven established facts deliberately placed upon this drawing for the purpose of emphasizing them are important beyond mere discussion, for they establish the fact that the fight against disease



CONCLUSIONS.

CHART #4.

BASED ON ALL THE ANIMALS FROM ALL THE EXPERIMENTS.

INOCULATION WEIGHT LINE.

NOTE THAT THE ANIMALS UNDERGOING OXIDATION NEVER FALL TO THIS LINE WHILE THE CHECK ANIMALS NEVER RISE TO IT.

THIS DRAWING COVERS THE AVERAGE WEIGHT CHANGES OF 256 ANIMALS.

OPPOSED TUBERCULOSIS.

175 ANIMALS WHICH HAVE PASSED THROUGH THE TREATMENT.

THEIR AVERAGE WEIGHT CURVE.

UNOPPOSED TUBERCULOSIS.

81 CHECK ANIMALS.

THEIR AVERAGE WEIGHT CURVE

SEPT. 1911

The Drawing Of The Eleven Facts.

Conclusions, Chart #5.

1\.

The Animal Oxidized Before Inoculation Always Shows The Beneficial Results Of His Preliminary Oxidation.

2\.

No Check Animal Has Ever Outlived The Inoculation.

3\.

Animals Under The Treatment Have Outlived The Inoculation.

4\.

No Inoculated Check Animal Has Ever Developed Tubercular Healing.

5\.

Inoculated Animals Placed Under The Treatment Have Frequently Developed Tubercular Healing.

6\.

The Animals Placed Under The Treatment Live Longer Than The Check Animals.

(Based On A Month As Four Weeks.)

7\.

No Check Animal Has Ever Lived 6 Months After Inoculation.

8\.

Animals Placed Under The Treatment Have Lived 18 Months.

9\.

No Inoculated Animal Has Ever Died From The Effects Of The Gas Where Less Than 4% Was Used.

10\.

Many Deaths Have Occurred Where Animals Have Been Undergoing Preliminary Oxidation.

11\.

Resistance To The Disease Tuberculosis Has Been Undeniably Established In This Most Delicate Animal.

Jas. Todd February 1913.

should be developed along the lines of common sense and broad chemical principles.

In leaving the first section of our animal experiments, we would ask you to face the question as to whether we have proved, as we have worked so long and so hard to prove by hard-won facts, the power for good of this changeable element OXYGEN and if we have, what duty the world owes, not to us, for we wish nothing, but rather to itself, that it may not lose the promise of it all.

This portion of our experiments with animals is here divided from the future work for two reasons; the one because the rest of the experiments are all designed to penetrate the mystery surrounding our problem, and the other because the general character of the force of the germs used here changes and so demonstrates that the tubercle bacillus is also a changeable force.

THE PROBLEM CONFRONTING US

We are now to face our problem in all its many phases and we would ask leniency with us and our method of writing as, on account of the number of factors, it is impossible to deal as tersely and clearly with the subject as we would wish, for we must endeavor to include every possible factor and every one of its possible effects.

It is plainly apparent that the first two experiments were more successful than the latter ones; that the November Experiment gave results, even when considered in connection with the mistakes in its design, much below those attained in the January and August Experiments. Moreover while making allowance for the benefit of the radical improvement caused in the First May Experiment by increasing the quantity of air and gas used in the animal rooms, we find that although the May Experiment was far ahead of the November Experiment yet it was not up to the January Experiment with tubercular healing present in every animal, nor to the August Experiment with its record of complete and permanent recovery.

Due to conditions which we will now consider and explain in detail, the operation of our machinery has been radically changed and the change, which was a gradual one, became effective at about the time of starting the November Experiment.

The January and August Experiments gave, at the start, falling weight curves which were followed at about the fourth or fifth week by strongly rising curves, the heavy increase in weight being maintained for a number of weeks. This condition was common to all the animals. Since then this very marked characteristic has almost, if not quite, disappeared. It is absent in the November Experiment and rarely, if at all, present in the First May Experiment.

In the January Experiment tubercular healing was present in every animal, absent in the November Experiment, and only occasionally present in the May Experiment.

This problem so plainly showing itself in the results is, in our judgment, probably mechanical or electrical. Mechanical operations affected chemical activity to such an extent as to change the work from a marked success to a less strong position, and taught us the lesson that the path is not free from obstacles; that we were not going to stumble, as it were, into the accomplishment of practical oxidation. The task before us now is to recover our lost position and above all to discover how and why we lost it, else we may not maintain it after we do recover it.

We shall pass now to the engine room and put down in full detail, for no factor must be missed, the operation of the machinery during the first two experiments.

The air in passing to the engine room was drawn down through a stack sixty feet high, then passed under ground in iron pipes about sixty feet to a point where it came up through a pipe into the "ozone" generator. In the generator were four cells each consisting of thirty-two six-inch square aluminum "mattresses" insulated from each other by glass plates which were about eight inches square and an eighth of an inch thick. The high tension current was held in these "mattresses," and the air flowing through them was acted upon by the electric current ("ozonized") and passed onward in its path to the animal rooms.

The case containing the four cells was of cast iron. The pipes leading from this case were ordinary five-inch iron pipes. The "ozonized" air passed through these pipes for about twelve feet and was then drawn into a small cast-iron Root blower, which first drew the air through the "ozone" generators and then *forced* it through brass pipes to the animal rooms, a distance of one hundred and sixty-seven feet.

In the chemical section we have given some very remarkable results obtained from exposing "ozone" to oxides of iron. It is very necessary to emphasize this, for it may be the clue to the result sought. Here it is sufficient to say that after being exposed to the effect of the electric current, the air was always exposed to intimate contact with iron because, first, all the piping and fittings to the blower were iron; second, because the air was compressed against the iron revolvers in the blower. The contact here was very close. The air in travelling to the animals passed through the pipe line for upwards of one hundred and seventy feet and, although the pipes were brass, we found them very heavily coated inside with oxide of iron, probably caused by the gas attacking the iron pipes and blower.

In this phase of the question notice that the air was drawn, not forced, through the "ozone" generators. The attenuation of the air as compared to its compression, as later shown, may be a vital factor. Notice also that from the moment the air was ozonized it was in direct contact with iron.

The electric current used to act upon the air was first generated by a small, specially wound dynamo, which delivered 100 volts, at very low amperage, to an ordinary transformer. The transformer then built the current up on a multiple of 66, thus delivering 6,600 volts to the ozone-generating cells.

During a period of more than two years, commencing at about the time of the starting of the November Experiment, the men operating the machinery could not maintain the required voltage on the glass plates and there was a gradual decrease from 6,600 volts to 6,000, or slightly less, by "burn outs," due to the cracking of the glass plates.

This trouble grew more and more serious until it was difficult to maintain 90 volts on the dynamos; in fact, the cells have broken down at 90 volts perhaps as often as ten times an hour. This required the attention of eight or ten men who did nothing but rebuild and replace glass cells in the cases. It was not practically possible to hold the cells up to their work.

For two years we bent every energy to the solution of this problem of insulation and in the end discovered a very simple cause, easily corrected, which allowed us to move forward in good control of the situation.

It is not necessary to retrace our steps to find the cause of the trouble. The solution came about in this way. We abandoned glass plates and insulated with sheets of paper fiber and attained the required voltage, but in a few weeks they burned up. Then sheets of vulcanized rubber were tried. Again we held the voltage, but in five weeks they too burned up. When, however, two cells, which had no connection that would allow fire to pass from one to the other, burned, one in the morning and one in the afternoon of the same day, both having been in constant use for five weeks, we commenced to see that something radical was taking place.

Dr. Riddle here suggested that we insulate with sheets of roofing slate, as it was hard and could not burn. This we did and in ten weeks the cells broke down and the secret was out, for the slate had changed from a hard, brittle material to a soft chalky condition.

The cause had at last become obvious and proved to be nothing more than that any insulation has but a certain life under the stress of the conditions to which it was here subjected. That the life should vary, as was the case here, with different materials seems altogether natural. In the glass we could see nothing but the cracked plate; the paper and the rubber burned up; but the slate, not being combustible, stayed and yielded its secret by becoming soft.

There were thirty-two glass plates in each generating cell. When one broke we quite naturally put in a new one together with the thirty-one old ones. But the glass continued to break. We now use only new glass plates and renew them all about every six months and the trouble has almost disappeared.

The discovery of the trouble with the insulation and its correction have wrought a very apparent change in operation which may mean a very vital change in the result.

In the chemical and mechanical section of this book we speak plainly as regards the ozone theory and we here state our belief that so-called "ozone" is really a number of gases, the character of which is at least dependent upon the speed of the passage of the air, the temperature, the voltage used and the character of the insulation. Finding it apparently affected by so many factors we must look with care at all possible changes, hence for our purpose here we assume "ozone" to be a number of gases, all of an oxidizing nature, but not all the same in either power or result. Further, we assume, for our purposes here, that which may well be so, namely, that some types of the gas will oxidize so perfectly as to cause cures, some will only act to the point of causing resistance to the disease; while still a third class have little or no effect in oxidizing the living body.

NITROGEN AS A POSSIBLE ASSISTANT TO OXYGEN

In our opinion nitrogen is the most mysterious of all the elements entering organic life. The generally assumed interpretation of it is that its chief characteristic is inertness and that in the atmosphere it is simply a diluter of the oxygen we breathe. But while it seems to lie, as it were, asleep to the superficial view, yet once aroused it becomes in very truth a giant. It is the base of the most violent in action of our compounds, the explosives. It is also one of the four predominating elements in our bodies and, for our purpose, has a wonderful significance in that it is one of what we call the ever-present elements, the elements of the atmosphere in which we are continually immersed. Long since we made up our minds to watch it closely, for oxygen might well need an assistant in its continual struggle with carbon and hydrogen.

Further, in nitrogen's only known point of elimination from the body we find the formula of uric acid to be $C_5H_4N_4O_3$ and of urea $CO(NH_2)_2$ and while oxygen is present in both cases, yet we find too little of it to carry forth from the body the large amount of carbon and hydrogen. In all other eliminations the oxygen is present in full strength (CO_2 and H_2O).

We may not be far wrong if we keep before us this mysterious element of the atmosphere and conclude that we shall consider oxygen as a vehicle of elimination for carbon and hydrogen when their forces have been spent in the reactions of life, and that perhaps nitrogen is its ever-present assistant.

Something must be done, we cannot stand still, nor can we afford to blindly grope. It is all essential to have a foundation from which to think and so we place the problem of nitrogen peroxide as possibly affecting our work.

To look now from theory to fact. When we operated our machinery at full power, 100 volts on the dynamos and 6,600 on the ozone generators, using glass insulation (we have never detected the presence of compounds of nitrogen except when using glass insulation), we found definite quantities of nitric acid present, so much so that we had to put drip pipes in the lines to take care of it on account of its destruction of the pipes and fittings. Further, when we investigated the oxides of iron which we have said were abundantly present in the pipe lines, we always found peroxide of nitrogen present. When the oxides were put in a test tube and heated we always obtained the orange-red gas NO_2.

When operating the machinery at 90 volts with glass insulation (5,940 on the "ozone" generators), we never found any evidence of the presence of nitrogen compounds. To make this doubly sure we placed some chemically pure ferric oxide in constant exposure to the gas for fifty days while operating at the lower voltage and we were unable, even after this long exposure, to obtain the least trace of NO_2 in it, thus well proving that compounds of nitrogen were not, at least to any practical extent, present under such operations.

It might seem from this that having based our whole case on oxygen, in our dilemma we now cast it aside and grasp at another; but look at the case fairly. We are not wedded to oxygen beyond the point at which common sense can sustain us. We are bent on solving this problem so as to be able to control our bodies and free ourselves from this crushing load of misery. There are few who will acknowledge that our bodies, composed as they are of nothing but the elements, *must be governed by the laws of the elements*, and we must convince them.

We would grasp at anything within reason to accomplish our purpose, but we are not doing so in this case, because with nitrogen not present, when operating at the low voltage, we establish a strong, positive resistance to the disease with which we are demonstrating, a resistance we cannot afford to lose under any circumstances. Furthermore what is peroxide of nitrogen (NO_2)?

One atom of nitrogen and two of oxygen, a strong oxidizing agent. And it may be a better method for the introduction of oxygen than the other. We have already said that so-called "ozone" was used only because it was the most practical oxidizing agent we had at hand.

The writer is much inclined to the view that nitrogen oxides are not primarily present in the "ozonized" air as a result of "sparking" in the generators, which we believe is the general view of their formation, but that they are formed by making a mixture of various forms of intensified oxygen, *some of which are powerful enough to oxidize nitrogen.*

If this should prove to be the case, the very gas that we apparently most need, if not foreseen and controlled, might waste its power in oxidizing nitrogen. Proper cooling of the generating cells and possible diluting of the "ozonized air" with pure air immediately after it leaves the ozonizing cell together with the use of the gas as nearly as possible at the moment it is made would all tend to prevent such possible loss of vital power. With proper facilities we consider the problem will yield to investigation.

Up to the present we have in our explanations paid little attention to certain markings on the drawing of the animals that lived more than a year from the First May Experiment. We will now consider the drawing on folding chart facing page 96, for the purpose of dealing with the questions of voltage and nitrogen as possibly affecting our work, for the reason that these animals with their remarkable record of prolonged life, by chance, as thoroughly as if by design, lived exposed to all the different voltages and insulating materials used in the solution of the problem of insulation.

In this drawing we study and follow in this new light the two upper animals, these being the only ones that lived to pass through all the phases. Placed under glass insulation at the low voltage they pass forward for forty-nine weeks. During the first forty-one weeks they lived comfortably, strongly resisting the disease. Then they received a blow. The clock-like precision of tuberculosis is always making itself apparent and here it will be noticed that all the animals experienced a blow at this time. They rose a little from this blow but became decadent. At forty-nine weeks they commenced to pass through the period of exposure to gas made at the high voltage with rubber insulation, but no effect is shown; they still continuing decadent. At a period of fifty-four weeks the change to slate insulation at the high voltage was reached, but still they followed their path of depression until at sixty-four weeks, when, unfortunately, past all hope of recovery, as they were literally devoured by the tubercle bacilli which had for more than a year been destroying their organs, they passed into the period of glass insulation with 6,700 volts acting on the generating cells. Compounds of nitrogen were also present. Both animals strongly responded in their curves to what would here appear to be the proper combination in machinery operation.

OTHER VARYING FACTORS

In the original operation of our machinery we drew the air through the apparatus while now we are forcing it. In the one case the air is stretched, in the other compressed into slightly smaller volume.

The attenuation of the air in the old method was about one half inch of water pressure; the compression used was about ten inches of water pressure.

In the old method of operation, the "ozonized" air was exposed to contact with iron, now there is no such contact, as our generating cells are enamelled inside and only tin, which "ozone" does not attack, and brass pipes, are used in transporting it.

In the old method of operation, the "ozonized" air passed one hundred and seventy feet through pipes to the animal room, while now the generators are not over twenty feet from the first animals.

To our mind it is peculiarly significant that, since we have adopted our new type generator, in which the air is *forced* through enamelled generators with a short passage (20 feet) to the animal rooms and no contact with iron, *we have had no cases of tubercular healing.*

We have had tubercular healing with both 6,000 and 6,600 volts when the air was *drawn* through cast-iron generators and had a long travel (170 feet) to the animals.

In speaking of the inoculations we have always spoken of using a mixture of three different strains of germs from different human sources, but this is because we are writing years after some of this work was done. The first two experiments were inoculated with but one strain of germs.

It is conceivable that this may be the cause of the difference. Once established as a fact it would not make much difference, because human beings afflicted with tuberculosis must, at least generally, have not a mixture but rather each his own particular form or strain of germs.

The thickness of the glass plates used in the "ozone" generators may well affect the result. We are now using plates about one eighth of an inch thick. We do not know positively the thickness of those originally used but think they were thinner.

The "mattresses" in which the high tension current is held as the air flows through them are of thin ribbon aluminum. They have been used for more than five years and the slight amount of oxide of aluminum on them may have some effect.

The quantity of gas used in the animal rooms should be more thoroughly investigated, for when we gathered the information that has led us to use two per cent. as equal in effect to three per cent., the machinery was operating at the low voltage, so that, on heavily inoculated animals, three or even four per cent. of the high tension gas might be advantageously used during the early stages of an experiment, say the first two, or possibly four weeks, or less of the high tension gas may be better.

Perhaps a longer period of preliminary oxidation might give still more conclusive proof.

We feel strongly that the best course to follow is to study the effect of different factors on the *character* of the weight curves, placing reliance on operations which gave, during the first three to five weeks, generally falling and rapidly changing curves. These curves should immediately after this period change to well maintained, strongly rising lines, as shown in the August Experiment.

It would seem hardly necessary for us, in view of the complicated nature of the problem, to warn against the use of a different method of making "ozonized air" from that used by us. At this stage and until the problem is fully worked out no change must be made. After that time some of the modern methods may be taken up if the necessary preliminary investigation of them is thorough and conservative.

In our judgment the modern "ozone" generators are based too much upon attaining the largest possible yield of the gas, whereas uniformity, rather than quantity, is the line that must be followed.

The questions raised by the problem of still higher voltage is worthy of careful investigation.

Full details of our machinery and its operation will be freely supplied to any who require it for purposes of legitimate investigation; we fortunately have very complete daily records kept during the January Experiment.

Judging this all-important problem by our best evidence, and yet keeping all possible changes in operation before us, we can rightly draw the conclusion that probably the solution lies in one of these directions, viz:

1. The strange effect of iron upon so-called ozone.
2. The effect of insulation.
3. The effect of electrical tension.
4. The effect of the nitrogen problem.
5. The effect of attenuation as compared with compression of the air as it passes through the electrical discharge.

In our judgment, it appears to tend toward glass insulation, full voltage, possibly nitrogen peroxide and the proper preparation of the air; a very abstruse problem.

The course that we are following in seeking the successful solution of the problem (the work is now under way and we hope to be able to state the trend of the results in the publication of this book) is first to establish or remove nitrogen peroxide as a factor. If we strongly establish it, the work is done. Failing to establish it, we shall go back to the identical operation of the original machinery and eliminate factor after factor. This course, if the necessary aid is forthcoming, must bring final success, because we are not advancing on theory alone but rather on the facts of the first two experiments—tubercular healing and life.

Here, for the present, the problem rests, *based on facts.*

Note: A careful study of the CHEMICAL AND MECHANICAL SECTION is necessary to a full conception of the problem.

THE SECOND SECTION OF THE ANIMAL EXPERIMENTS

PREFACE

The publication of this book having been held back for the purpose of carrying on further experiments, in an endeavor to outline the problem more distinctly, means that this section, including, as it does, the last of the animal experiments, is the last that we shall write, although it cannot come last in the arrangement of the book.

We are now face to face with exceedingly important and far-reaching questions as we find that we must not be content to show merely the trend of the separate experiments, but that we must take our work as a whole and prove that which was beyond our conception when we first undertook it; namely, that oxygen, *can and does take many forms.*

This new conception of the activities of the element is more far-reaching than can now be seen. We will endeavor to establish it as a fact by showing that it is the only line of reasoning *which can and does fully explain our work from one end to the other.*

In this connection we wish to bring out distinctly the fact that when we speak of the different "forms" of an element, we do not limit ourselves to a narrow interpretation of the word "form." We do not care for shape nor changes in volume; it is *activities* with which we deal in the broadest sense of the word—the activities of an element changed, in our case at least, by power applied from without the element.

We have not attained a full solution of the problem, as we have failed for lack of facilities, but we do prove the principles involved and present the problem within comparatively narrow limits, as well as adding much to our accumulation of facts and our power to reason along these new lines of thought.

Room #1

Cage #1.
4 ⊕ Animals.
#1 To #4.

Treatment
2% "O_3"

Cage #2.
7 ⊖ Animals.
#20 To #26.

Room #2.

Cage #3.
4 ⊕ Animals.
4 ⊕ N. Animals.
#30 To #37.

Treatment
2% "O_3"
And
100 C.C. Per Minute Of
$N\ O_2$

Cage #4.
7 ⊖ Animals.
#40 To #46.

Room #3.

Cage #5.
4 ⊕ Animals.
#50 To #53.

Treatment
Full Blast
Of Air And
100 C.C. Per Minute Of
$N\ O_2$

Cage #6.
7 ⊖ Animals.
#60 To #66.

Check Animals To Be Kept At The Haysville Works.

Cage #7.
10 ⊖ Animals
Checks
#70 To #79.

⟨Experiment 2-20-13.⟩

The Plan Of The Experiment.

47 Male Guinea Pigs Divided Into Eight Sections.
Inoculation $\frac{1}{2}$ C.C. Sub-cutaneously Germs From 3 Different Human Sources. All Animals "C" Inoculation = $\frac{1}{2000}$ Gram = ·25 Million Tubercle Bacilli.

Machinery.

Voltage 100-102 Volts A.C (=6600-6732 Volts On Cells)

Glass Insulation.

Air To Be Forced Down Through 4 Enamelled Generators

Iron.

Gas To Have No Contact With Bare Iron.
Capacity Of Each Room 500 Cu. Ft. One Distributor To A Room.

Laboratory Book #2 Pages 87-103

Experiment 2-20-13.
Chart #1 Plan
Jas Ladd Feb'y, 1913.

EXPERIMENT 2-20-13

THE NITROGEN EXPERIMENT

The prominence of peroxide of nitrogen (NO_2) as a possible factor in the earlier experiments, required that the design of the next experiment should be based upon an attempt to either sustain nitrogen oxides as vital to the process or dispose of them, and so we designed this experiment to meet, as broadly as possible, the full scope of the nitrogen problem.

The design of the experiment is good for the purpose required, even though it was hampered at the start by the fact that we had no data in regard to the quantity of peroxide of nitrogen to be used on the animals, but our facilities would not admit of separate and protracted experiments upon this question, consequently we decided to use one hundred cubic centimeters of NO_2 per minute, continuously generated within the room by the action of nitric acid upon iron and made possible by a very simple apparatus designed by Doctor Riddle.

Slightly diluted acid was dropped from a tap funnel, in uniform quantity, upon a large mass of small iron nails, at a rate which careful experiment showed to yield closely to 100 c.c. of NO_2 per minute.

The blast of pure air from the distributor kept the nitrogen peroxide in constant quantity and thoroughly diffused. Day and night, for more than one year, the animals in two rooms were kept under the constant influence of the oxide.

On page 126 we place the plan of the experiment and ask close study of it, as the whole scope of the question is here presented. Besides using both oxidized and natural animals, we also include four animals, in cage No. 3, which had been treated with both "ozone" and peroxide of nitrogen for ten weeks *before* their inoculation, thus giving us the effect of preliminary treatment by means of peroxide of nitrogen. Please note and understand this phase of the experiment, as it becomes important later. The animals are marked ⌖ N to distinguish them from the ordinary ⌖ ones, and are placed, after inoculation, with other animals in cage No. 3, Room No. 2, and are from that time continually under the influence of three forces; the tubercle bacilli, so-called ozone and nitrogen peroxide, and constantly under exactly the same conditions as both the natural and oxidized animals sharing their room.

The general plan of the experiment was to use three main groups of animals, each group consisting of both oxidized and natural animals, and each main group in a separate room and each room under a different prescribed condition of oxidation, oxidation and nitrification, or nitrification alone.

In Room No. 1 we used two per cent. of "ozone," thus having both natural and oxidized animals under the regular process.

In Room No. 2 we used two per cent. of "ozone" and 100 c.c. per minute of NO_2, thus exposing both oxidized and natural animals to the combined action of both gases.

In this room were also included the four animals before referred to which had been treated with both "ozone" and NO_2, before their inoculation, and marked ⌖ N.

In Room No. 3 we excluded the "ozone" and used NO_2 alone. Thus we have, opposed to the power of the same inoculation:

In Room No. 1 "ozone" alone.

In Room No. 2 "ozone" and peroxide of nitrogen.

In Room No. 3 peroxide of nitrogen alone.

In each room there was a blast of pure air from the distributor.

The machinery operations are all shown on the plan. Please note that the air is to be *forced* through the "ozone" generators, as this becomes very important later.

Now that we understand the plan, let us look at the results.

At the start we make use of the most complicated drawing yet used in this work, as we find it necessary to bring together many factors and we must rely strongly upon familiarity with this and other drawings, or at least willingness to study them sufficiently to understand the subject.

In all the drawings used in this section of the book we have adopted, in the weight curves, a dotted line for the natural animals and a solid line for the oxidized ones, thus keeping the curves absolutely distinct on the question of ⊕ and ⊖.

On page 130 we place the drawing EXPERIMENT 2–20–13—CHART NO. 2.

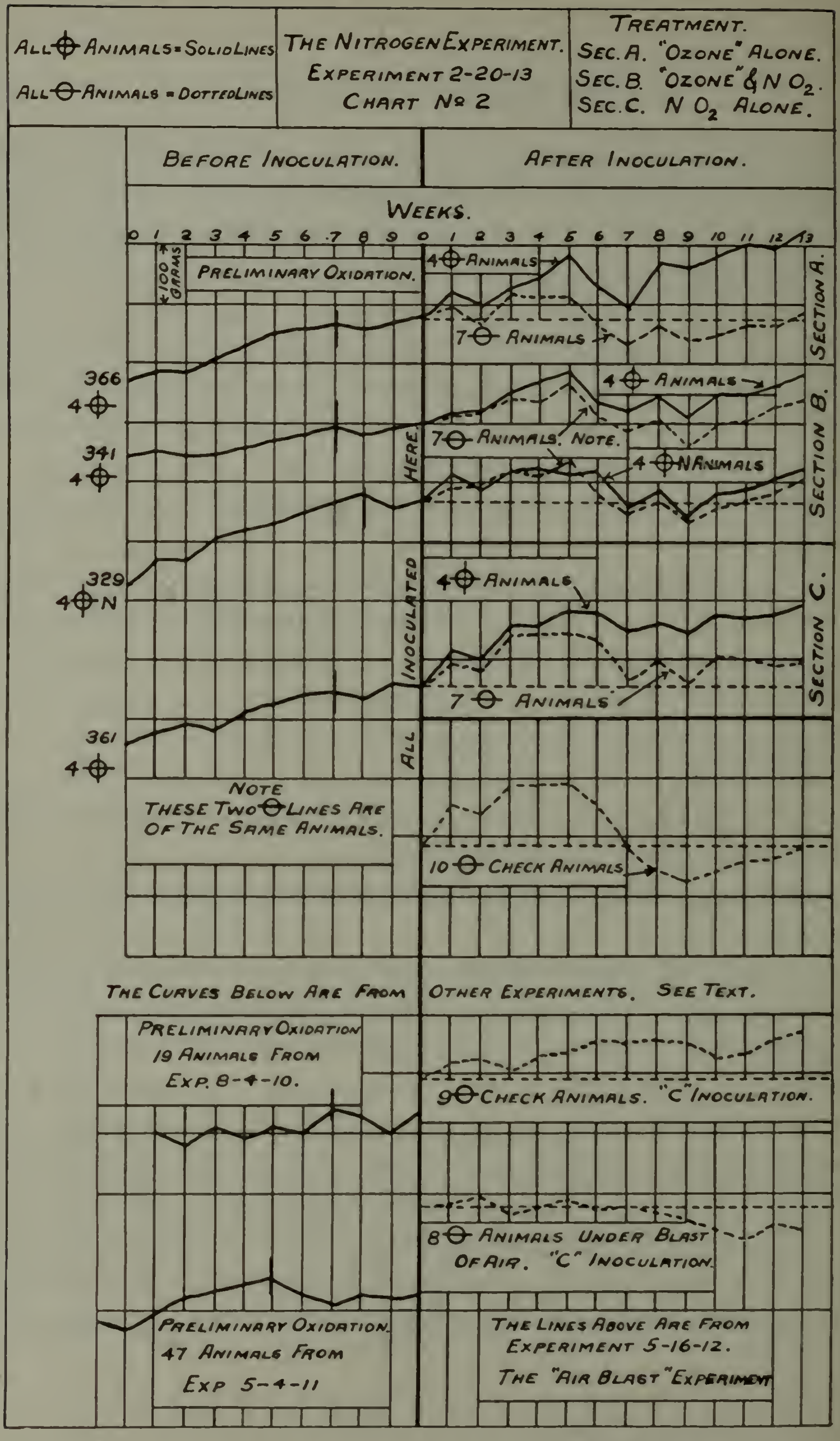
This drawing covers so much that it is necessary to proceed very systematically in its study, hence we will commence on the upper left side, this being the initial place in the study of the work. In this section of the drawing are the four weight curves of the four groups of oxidized animals during their preliminary oxidation.

We wish first to draw attention to the upper curve at the seventh week; we having placed a heavy perpendicular line crossing the weight curve at this point to attract attention.

Notice the distinct downward dip from the seventh to the eighth week and then the recovery.

During preliminary oxidation we have always noted this slight but exceedingly distinct change in the weight curve and it has been so persistently present as to force attention and to hold it after once discovered. It not only occurs in average curves but almost always in the individual and is worthy of consideration, and we are so convinced that it is a distinct mark of our work that we would hesitate to consider an animal properly oxidized that did not show it.

Aided by the heavier perpendicular line that has been placed in each case where the dip commences, we ask you to look at these four weight curves and notice how this line occurs in each case.



Jas. Todd. Jan. 1914.

It is a week later in the case of the four animals that are being treated with both nitrogen and oxygen.

Now pass to the curves at the lower left in the section of preliminary oxidation, as we have placed here the curves of preliminary oxidation taken from our previous work, the August and the First May Experiments.

In both experiments, covering in the one case nineteen animals and in the other forty-seven, we get the same distinct fall in the weight curve of preliminary oxidation at practically the same time.

This means something and has so impressed us that, while having no explanation to offer, yet we place it thus distinctly before you.

We will now leave the preliminary oxidation section and pass to the inoculation, bearing well in mind that we are now facing, by deliberate design, the tubercle bacilli in unchanged force from one end of our experiment to the other, as we have inoculated each animal with the same quantity of the same germs on the same day so that the germs are prevented from injuring our work by acting differently in different cases, consequently any marked changes in the animals will be due to the conditions of oxidation or nitrification under which we have deliberately placed them.

At last we are face to face with the nitrogen problem. Entrancing and elusive as it has been, it must now divulge something of its truth; not all, for we are not fully equipped, as we do not know just how much NO_2 to use and we also have traces of NO_2 present in our "ozone," due to the high voltage and the glass insulation.

Before starting to examine the problem we wish to step aside to make an explanation in regard to the check animals, not only in this experiment, but also in each of the following ones.

Those who seemed to wish to aid us at the time we were doing this work expressed the opinion that we should get our germs from a more authoritative source and suggested supplying them from an institution that they considered above criticism. We accepted the advice and have thereby injured our work quite a good deal by the use of germs so poorly cultured as to be very slow in their action on the animals.

In this experiment one check animal lived for thirty-six weeks and we have had to completely abandon another experiment, losing a year of hard work on it, because at the end of a year the check animals were perfectly well.

We place this on record here, not in the sense of criticism, but entirely for the purpose of showing the great necessity, if this work is to be brought to a successful issue, of our being supplied with the necessary resources to make us independent in every department.

Let us turn again to our drawing to study the curves after the inoculation. The weight curves are carried to the death of the first animal. The curve of the ten check animals which we will take first is the third curve from the bottom on the right-hand side; it is marked "10 ⊖ Check Animals."

Until the disease asserted itself at the end of the third week, these animals increased strongly in weight, then they held their own for two weeks, then fell rapidly to far below their weight when inoculated, partly recovered the loss, and then gradually died off, their autopsies showing them to be heavily involved with the disease in all their organs.

Taking this condition of affairs as the natural trend of the disease in this experiment, we will pass to the curves at the top of the drawing where we have four ⊕ and seven ⊖ animals placed under two per cent. of "ozone" but without any nitrogen compounds present, other than the traces made by the machinery operations.

While the seven natural ⊖ animals act much as the check animals, yet they do not drop as far or as rapidly. But, on looking at the solid curve showing the weight changes of the four previously oxidized animals, and tracing the line back through the preliminary oxidation period, we see that it fairly springs forward when the tubercle bacilli enter the bodies of the animals. For five weeks it rises, gaining more than one hundred grams per animal; then it falls back only to regain its full strength and power. We are here face to face with the most wonderful evidence of the power of oxidation that the work has yet shown.

In the First May Experiment (EXPERIMENT 5–4–11) the oxidized animals rose for three weeks, while here we find the movement continued for five weeks and then resumed in even greater strength.

Perhaps in our zeal we have, or shall, impress the reader with the idea that the curve that falls after inoculation and then rises is the only one we believe in, but this is not so; in the complexity of the situation, this strongly rising curve just after inoculation must not be cast aside.

The trouble with it is that it does not now maintain its advance quite far enough, but one of our real problems is to cause this curve to maintain its strength, for if we accomplish this it may even supersede the other and attain the most successful result.

We have often spoken of the ⊕ animals as compared to the ⊖ animals and the proofs they give of success in one of the greatest problems of the world, but we cannot say too much on such a subject. On looking at the curves again and again one cannot fail to be impressed by the truth they convey, nor turn away from their mute appeal for the millions that are dying. They are more important than nitrogen will ever be, for they demonstrate the effect of successful oxidation.

There are four animals in this group and *one half of them lived for more than sixty weeks.* We shall see more of them later.

Now let us take the next group of animals, the ones placed in "ozone" and nitrogen peroxide.

The animals do not rise as rapidly as the ones in the regular treatment, but note that the solid curve of the ⊕ draws away from the natural animals. More proof for the "ozone" process. Again ⊕ and ⊖.

The weight curves seem to show the animals overloaded; they rise heavily, as if they were carrying a burden.

Now let us take the next pair of curves which carry the four animals which were treated with both "ozone" and peroxide of nitrogen before their inoculation, the ⊕ N.

The evidence of the heavy load shown in the others here becomes more definite and the solid curve merges with the dotted, and glancing to the top of the drawing, and down through each pair of curves, we must admit that nitrogen, *as we have used it here*, loses its value and "ozone" proves itself. This is either the case or the combined treatment is too heavy.

Now we pass to the next set of curves where we are using only air and nitrogen peroxide. The load is lifted and the ⊕ again stands strongly forward.

The dotted curve of the natural animals does not fall below the inoculation weight as the check animals do; it always stays above. One of these seven natural animals lived for one year, and this fact, considered together with the weight changes, forces us to admit that we have evidence in favor of nitrogen peroxide, and the nitrogen problem is still before us unsolved, but apparently not so vital as we at one time thought, but more work must be done before a final judgment is passed.

The writer's opinion, given for what it is worth, is that nitrogen peroxide either as a nitrifier or as an oxidizer may well hold improvement for our process, but he does not think that it holds any really vital gift.

Mr. Clapp appears to be somewhat at variance with the writer upon this question, as he has a great deal of faith in the possibilities of the proper use of nitrogen compounds; he may well be right; certainly more work will have to be done on the subject.

This last set of animals, the ones in NO_2 and air, naturally raise the question of the effect of the blast of air alone, as it is certainly a radical step forward on the lines of the so-called fresh air treatments, which we consider as being treatments limited to good surroundings and normal oxidation.

In order to meet this criticism of this section of the experiment, we place a set of curves on the bottom of the drawing from an experiment (the Air Blast Experiment) on the subject made, but not here published, as it is too far outside of the path we are following.

An examination of these two curves shows the surprising fact that the animals under the blast of air did not do so well as the check animals.

On folding chart facing page 136 we place CHART NO. 3—The Nitrogen Experiment.

On this drawing we have placed the four animals that lived a year or more. The curve at the bottom is the natural animal that was in the air and NO_2 treatment.

The reader will please note that this is the only natural animal that lived a year. We leave its curve for his study; it certainly tells us to hesitate before casting the nitrogen problem completely aside.

The animal next above is an ⌖ under the combined treatment of NO_2 and the "ozone."

Please notice that of the four animals on this drawing three are ⌖ and at the same time we wish once more to call attention to the two upper animals, No. 2 and No. 4. These are *two of four* in their class, ⌖ animals in the regular treatment, and they outlived all others. The evidence in favor of our process is here overwhelming.

Important as these points are, we did not make this drawing to demonstrate them, but for a far more important purpose.

In the early portions of our work we drew the air through the ozonizers, thus stretching it slightly, while in our later work we forced it through, thus compressing it slightly; neither change was great, neither seemed material, but in September, 1913, it developed that since we had been forcing the air through the generators we had never had a case of tubercular healing, while before that time we had had many such cases.

We at once investigated the matter and found that our impression was correct and on September 15, 1913, commenced to draw the air through the generators, thus stretching the air molecules slightly before the electric current acted upon them.

This was at the thirtieth week and we ask that the top curve, animal No. 2, be studied closely, as we believe we have the truth at last.

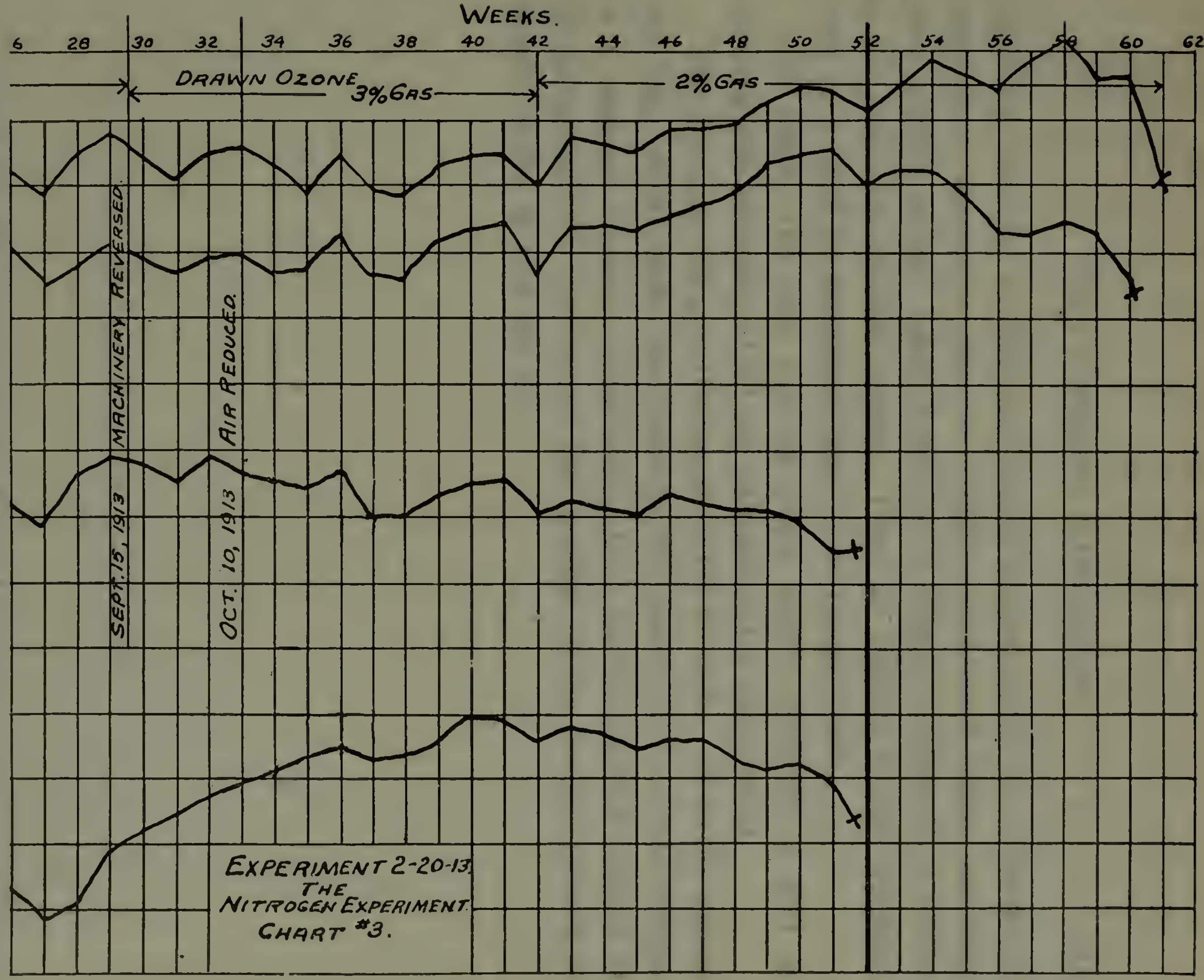
The animal reached the apex of his weight at the twenty-fourth week and commenced to fall gradually.

On the thirtieth week the new form of oxygen commenced to act upon him. From then to the thirty-eighth week he fell to lower and lower points at the end of each rally; then the power seemed to get control and gradually the whole character of his weight curve changed and he rose, at first slowly and then strongly and persistently.

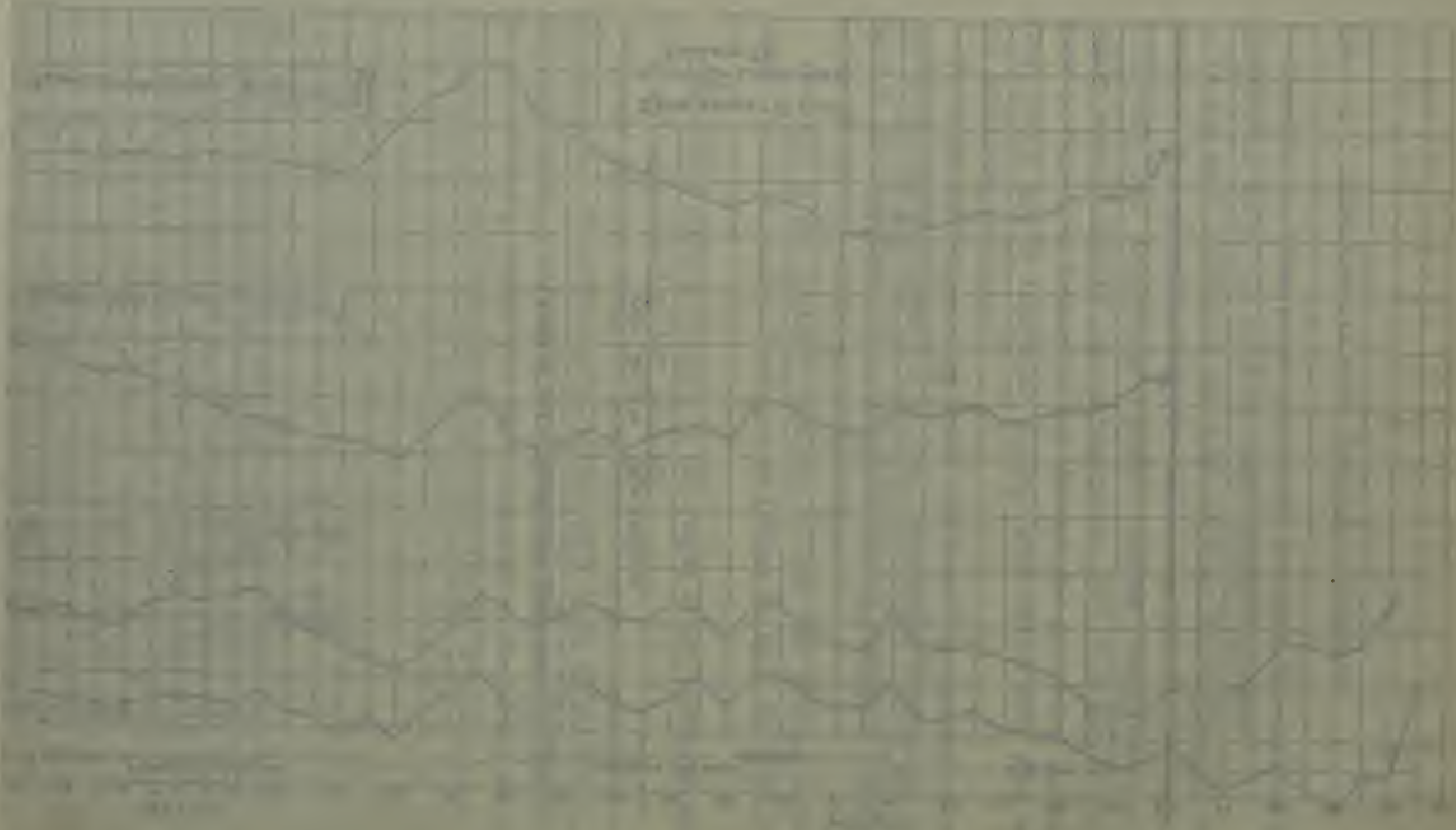
Applying the same close examination to his mate, No. 4, we find that the curves are almost identically the same.

Looking now at the other two animals, No. 30 and No. 66, we see how their curves are devoid of the characteristics of the other two. One of these two latter animals is not under "ozone," and the other is under both NO_2 and "ozone," too heavy a load.

Here now is the clue we follow, as this is where we believe both truth and success lie, and we base our next experiment upon this



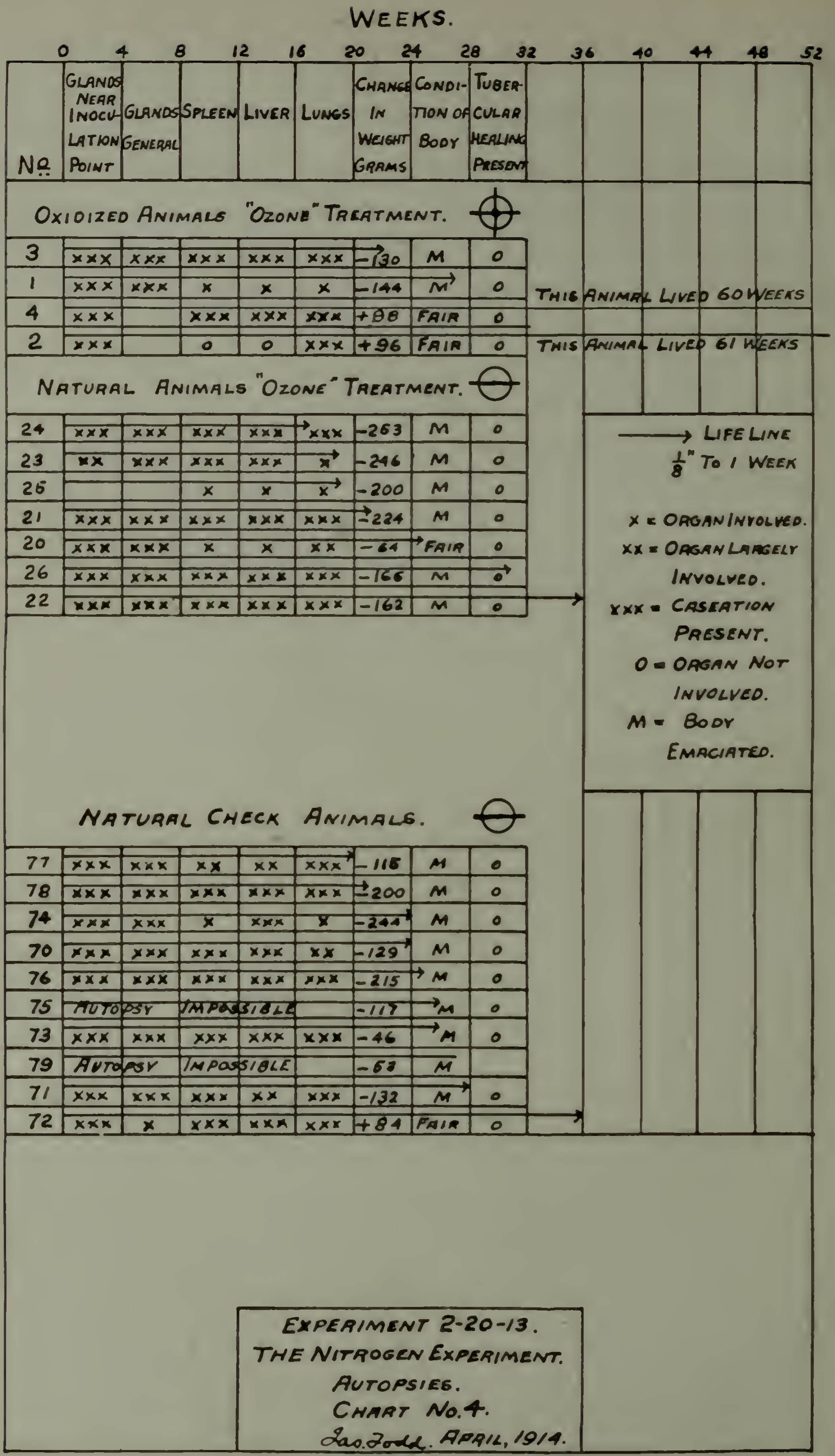
Experiment 2-20-13
The Nitrogen Experiment
Chart #3.



reasoning, namely: a different form of oxygen made by a change in mechanical operation—*the air slightly compressed before ozonizing gives resistive oxygen, while if the air is slightly attenuated, it results in the formation of vital oxygen.* Here we believe is our problem; more of it shall be presented later in its proper place.

On pages 138 and 139 we place charts numbers 4 and 5, covering the autopsies of all the animals in the experiment.

The life lines will give the length of life of each. As to the autopsies, they are not under discussion at the present, but we shall devote, in a separate chapter, considerable time to the general subject of the autopsies, for they prove the benefits of the process almost as clearly as the ⊕ and the ⊖.



WEEKS.

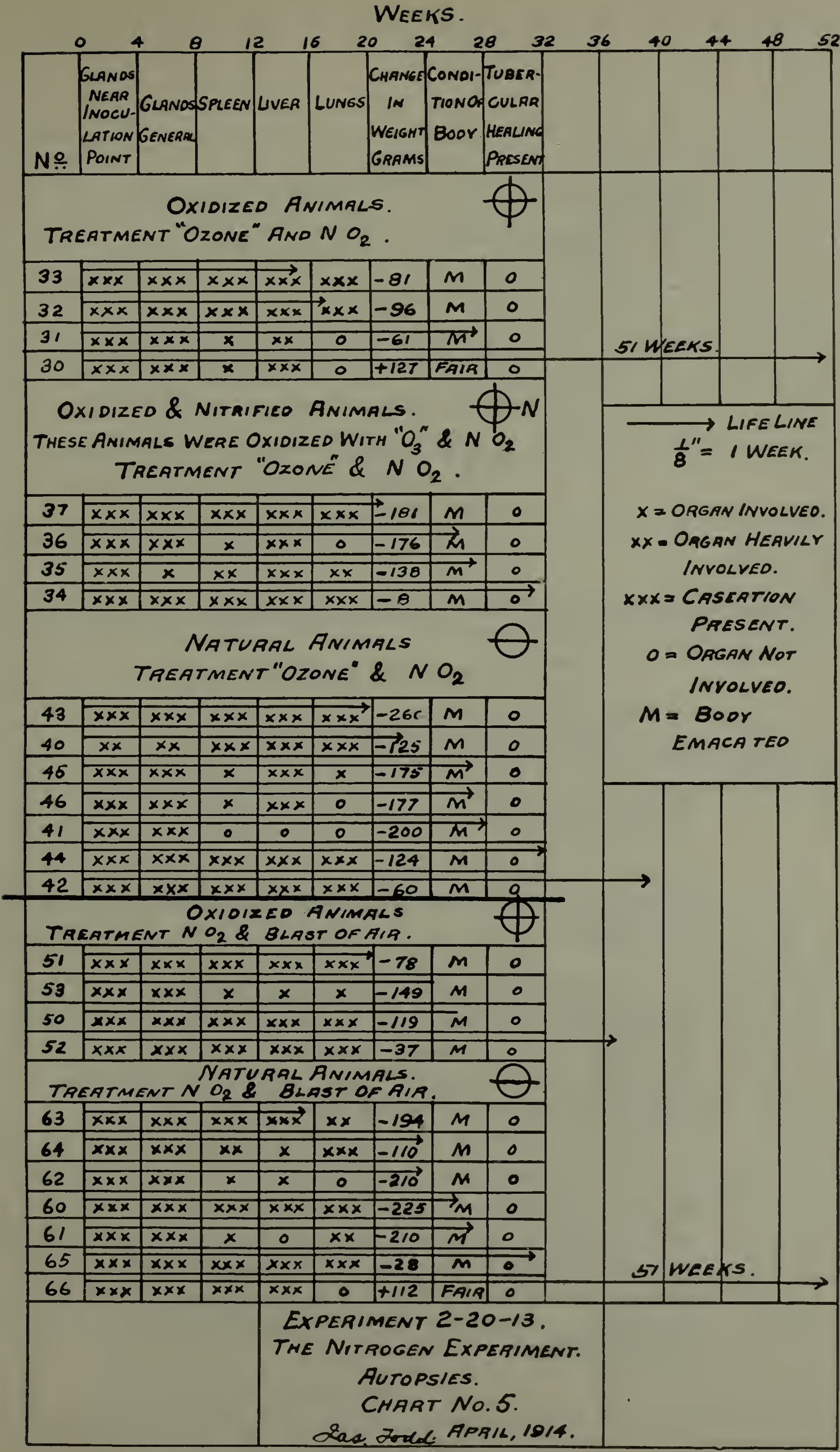
0 4 8 12 16 20 24 28 32 36 40 44 48 52

No.	Glands Near Inoculation Point	Glands General	Spleen	Liver	Lungs	Change in Weight Grams	Condition of Body	Tubercular Healing Present	
OXIDIZED ANIMALS "OZONE" TREATMENT.									
3	xxx	xxx	xxx	xxx	xxx	-130	M	0	
1	xxx	xxx	x	x	x	-144	M	0	THIS ANIMAL LIVED 60 WEEKS
4	xxx		xxx	xxx	xxx	+88	FAIR	0	
2	xxx		0	0	xxx	+96	FAIR	0	THIS ANIMAL LIVED 61 WEEKS
NATURAL ANIMALS "OZONE" TREATMENT.									
24	xxx	xxx	xxx	xxx	xxx	-263	M	0	
23	xx	xxx	xxx	xxx	x	-246	M	0	
25			x	x	x	-200	M	0	
21	xxx	xxx	xxx	xxx	xxx	-224	M	0	
20	xxx	xxx	x	x	xx	-64	FAIR	0	
26	xxx	xxx	xxx	xxx	xxx	-166	M	0	
22	xxx	xxx	xxx	xxx	xxx	-162	M	0	
NATURAL CHECK ANIMALS.									
77	xxx	xxx	xx	xx	xxx	-115	M	0	
78	xxx	xxx	xxx	xxx	xxx	-200	M	0	
74	xxx	xxx	x	xxx	x	-244	M	0	
70	xxx	xxx	xxx	xxx	xx	-129	M	0	
76	xxx	xxx	xxx	xxx	xxx	-215	M	0	
75	AUTOPSY	IMPOSSIBLE				-117	M	0	
73	xxx	xxx	xxx	xxx	xxx	-46	M	0	
79	AUTOPSY	IMPOSSIBLE				-63	M		
71	xxx	xxx	xxx	xx	xxx	-132	M	0	
72	xxx	x	xxx	xxx	xxx	+84	FAIR	0	

⟶ LIFE LINE
1/8" TO 1 WEEK

X = ORGAN INVOLVED.
XX = ORGAN LARGELY INVOLVED.
XXX = CASEATION PRESENT.
0 = ORGAN NOT INVOLVED.
M = BODY EMACIATED.

EXPERIMENT 2-20-13.
THE NITROGEN EXPERIMENT.
AUTOPSIES.
CHART No. 4.
Jas. Todd. APRIL, 1914.



WEEKS.

0 4 8 12 16 20 24 28 32 36 40 44 48 52

Nº	GLANDS NEAR INOCULATION POINT	GLANDS GENERAL	SPLEEN	LIVER	LUNGS	CHANGE IN WEIGHT GRAMS	CONDITION OF BODY	TUBERCULAR HEALING PRESENT
OXIDIZED ANIMALS. TREATMENT "OZONE" AND N O_2. ⊕								
33	xxx	xxx	xxx	xxx	xxx	-81	M	0
32	xxx	xxx	xxx	xxx	xxx	-96	M	0
31	xxx	xxx	x	xx	0	-61	M	0
30	xxx	xxx	x	xxx	0	+127	FAIR	0
OXIDIZED & NITRIFIED ANIMALS. ⊕N THESE ANIMALS WERE OXIDIZED WITH "O_3" & N O_2 TREATMENT "OZONE" & N O_2.								
37	xxx	xxx	xxx	xxx	xxx	-181	M	0
36	xxx	xxx	x	xxx	0	-176	M	0
35	xxx	x	xx	xxx	xx	-138	M	0
34	xxx	xxx	xxx	xxx	xxx	-8	M	0
NATURAL ANIMALS TREATMENT "OZONE" & N O_2 ⊖								
43	xxx	xxx	xxx	xxx	xxx	-260	M	0
40	xx	xx	xxx	xxx	xxx	-125	M	0
45	xxx	xxx	x	xxx	x	-175	M	0
46	xxx	xxx	x	xxx	0	-177	M	0
41	xxx	xxx	0	0	0	-200	M	0
44	xxx	xxx	xxx	xxx	xxx	-124	M	0
42	xxx	xxx	xxx	xxx	xxx	-60	M	0
OXIDIZED ANIMALS TREATMENT N O_2 & BLAST OF AIR. ⊕								
51	xxx	xxx	xxx	xxx	xxx	-78	M	0
53	xxx	xxx	x	x	x	-149	M	0
50	xxx	xxx	xxx	xxx	xxx	-119	M	0
52	xxx	xxx	xxx	xxx	xxx	-37	M	0
NATURAL ANIMALS. TREATMENT N O_2 & BLAST OF AIR. ⊖								
63	xxx	xxx	xxx	xxx	xx	-194	M	0
64	xxx	xxx	xx	x	xxx	-110	M	0
62	xxx	xxx	x	x	0	-210	M	0
60	xxx	xxx	xxx	xxx	xxx	-225	M	0
61	xxx	xxx	x	0	xx	-210	M	0
65	xxx	xxx	xxx	xxx	xxx	-28	M	0
66	xxx	xxx	xxx	xxx	0	+112	FAIR	0

51 WEEKS.

→ LIFE LINE

$\frac{1}{8}$" = 1 WEEK.

x = ORGAN INVOLVED.

xx = ORGAN HEAVILY INVOLVED.

xxx = CASEATION PRESENT.

0 = ORGAN NOT INVOLVED.

M = BODY EMACIATED

57 WEEKS.

EXPERIMENT 2-20-13.
THE NITROGEN EXPERIMENT.
AUTOPSIES.
CHART NO. 5.
Jas. Todd. APRIL, 1914.

10 ⊕ Animals
*1 To *10
Under Treatment.

10 ⊖ Animals.
*20 To *29.
Under Treatment.

10 ⊖ Animals.
*30 To *39.
Check Animals.

‹ Experiment 3-12-14. ›

The Plan Of The Experiment.

The Experiment Is Based On Certain Specified Mechanical Operations.

30 Male Guinea Pigs Divided Into Three Sections.

Object Of The Experiment To Test Certain Mechanical Operations As Affecting The Gas So Produced.

"C" Inoculation (25 Million Germs).
Mixed Germs From Two Human Sources.
Treatment, 3% "Ozone" For 2 Weeks, Then 2%
The ⊕ Animals Have Their Preliminary Oxidation Under Gas Made Under The Same Conditions As That Used Throughout This Experiment.

Mechanical Operation.

Glass Insulation. 100-102 Volts On Dynamo
6600 To 6732 Volts On "Ozone" Generators
Air To Be Drawn Through The "Ozonizers".
Air To Be Reduced To Minimum Practical Quantity, About 26 Cu. Ft. Per Minute To Each Cell.

Jas. Todd
Jan'y. 1914.

EXPERIMENT 3–12–14

THE MARCH EXPERIMENT

On page 140 we place the plan of this experiment.

The plan is a very simple one, covering three sets of ten animals each, one set oxidized for ten weeks with the same type of gas as used after inoculation, the two other sets being natural animals, one set passing through the treatment with the ⊕ ones and the other set used as natural check animals.

The machinery operations upon which we based the experiment was the use of full voltage on glass plates and the drawing of the air through the generators, thus attenuating it slightly before acting upon it with the electric current; this, instead of the slight compression of air, being the essential of the plan.

On page 143 we place CHART NO. 2—EXPERIMENT 3–12–14.

On the left section of the drawing is the average weight changes of the ten ⊕ animals during their oxidation, the "oxidation dip" is very apparent between the sixth and seventh week.

We next come to the inoculation on March 12, 1914.

It will be noticed that the plan calls for ten animals in each section and that there are only five to each section on this drawing. The reason for this requires digression for the purpose of explanation and the explanation involves the reason why we failed to attain a decisive result.

The writer was away at the time of the inoculation and did not return until the first month had passed.

When he returned Doctor Riddle reported the work as progressing in exact accordance with the plan except that he was having a great deal of trouble in making the gas strong enough.

We at once started to investigate the trouble and found the following state of affairs:

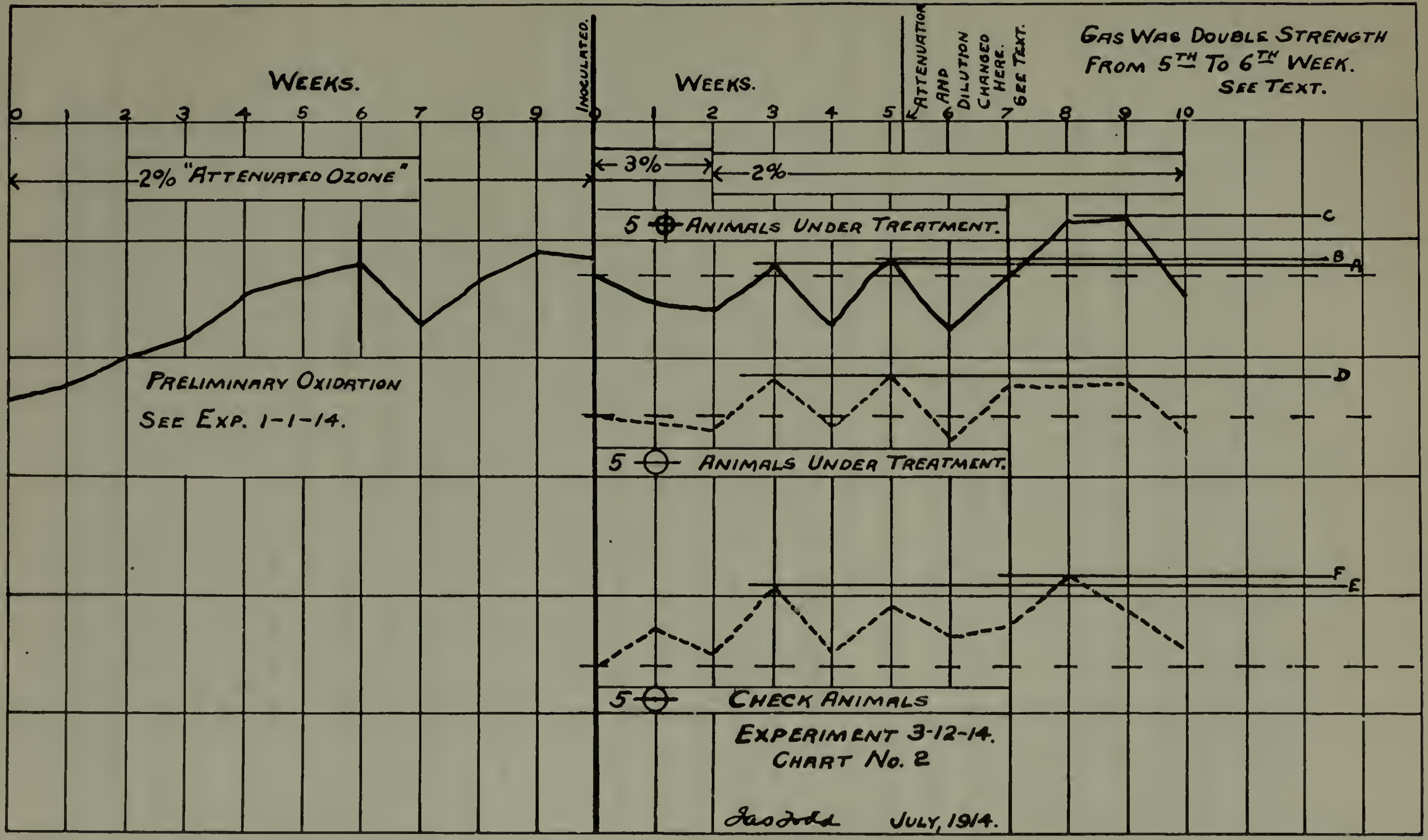
We had, ever since the latter part of the First May Experiment (EXPERIMENT 5–4–11), been using solid, well-constructed "ozone" generators of our own design through which we had forced the air. When we changed the plan and commenced to draw the air we had to return to the original generators used in the earlier experiments. These were of very poor design and construction, being of very light cast iron and not machined where they were fitted together. We found a very heavy leakage of air being drawn into the casing just above the generating cells which diluted the gas, and we immediately dismantled the generators and reset them in a perfectly tight, riveted, steel casing that we had had made some time before with the idea of water-cooling the generators.

The strength of the gas doubled as soon as the tight casing was set in place, thus showing that the dilution by leakage had amounted to about fifty per cent.

This question of leakage at once assumes great importance as a possible factor in our problem and so must be explicitly dealt with here, because of the fact that these leaky generators were the ones used during the first two experiments, EXPERIMENT 1–14–10 and EXPERIMENT 8–4–10, the January and the August Experiments.

When one stops to consider every possible factor in this mystery, he must allow that this accidental finding is full of possible significance, because the effect of mixing our "ozonized" air, at the very moment of its formation, with practically an equal volume of pure air would bring about two well-defined methods of changing chemical activity.

In the first place the ozonized air would be cooled by the fresh air immediately after it left the heat of the electrical discharge, which caused its formation into extra active gases. This cooling would tend to stop further changes, because heat is the great exciter of chemical activity and would therefore tend to help us deliver to


Weeks.
0 1 2 3 4 5 6 7 8 9
Inoculated.
Weeks.
0 1 2 3 4 5 6 7 8 9 10
Attenuation and Dilution Changed Here. See Text.
Gas Was Double Strength From 5th To 6th Week. See Text.
2% "Attenuated Ozone"
3%
2%
5 Animals Under Treatment.
C
B
A
Preliminary Oxidation
See Exp. 1-1-14.
D
5 Animals Under Treatment.
F
E
5 Check Animals
Experiment 3-12-14.
Chart No. 2
Jas Todd
July, 1914.

our animals a very fragile form of the gas, which, if not cooled, might well take other forms not so useful to our work. The fact of the dilution by the air leaking into the generators could well bring about a like result by changing concentration. Undoubtedly in dealing with the questions arising in the future development of the work, this question, based on accidental leakage, must be closely investigated.

In this respect it is proper for the writer to say that he has believed for a long time that when we finally discover the form of oxygen best suited to our work, we shall find it to be an exceedingly fragile gas, as he can only conceive of a fragile, and consequently intensely oxidizing, form as being capable of actually taking a dominating part in the chemistry of life when injected into that sphere by man's plan, rather than by nature's operations.

The one thing that has disheartened us more than anything else in this whole work has been the inadequate facilities at our disposal, which have forced us at all times to gamble with the result instead of being able to deliberately press the question to a conclusion.

In the Nitrogen Experiment, we had to guess at the result because we had neither time nor facilities for determining the correct quantity of peroxide of nitrogen to use; such has been the case from the beginning, and in this experiment we have had to take chances on the proper attenuation of the air before "ozonizing" it.

To have done even scant justice to our work we should have had sufficient machinery to have explored inch by inch the way from twenty water inches of vacuum to twenty water inches of pressure, and the number of animals necessary to carry in each section, but we had but one set of machinery and were therefore limited to its use in endeavoring to solve a problem that means so much.

We have said all this in candid explanation of the causes that have apparently led to the vital injury of the experiment in a seemingly reasonable step taken only after careful consideration.

The plan of the experiment had not called for any particular tension of the air; the actual operation of the machinery was showing about one fourth of a water inch of tension to the air; this was very slight and indefinite and at the time we changed from the leaky generator casing, we discussed the matter and decided to raise this to one inch as being the lightest, definite back pressure we could carry. From the sixth week on we operated under this new condition.

In addition to this, for five days we did not change our distributors, to compensate for the double strength of gas we were making, made double strength by removing the leakage of air into the generators, as we seemed to have overlooked this entirely.

On turning to the life lines on the autopsy charts (page 149) it will be seen that our animals died very rapidly. We could not alter conditions, for it was too late. Moreover we considered it wise to let the experiment stand as demonstrating the fact that we had fallen into a position requiring great care, for it was proving that we could make a gas that was so active as to be fatal. In other words, we had apparently stumbled upon a form of oxygen that was so active as to be dangerous to life.

In this connection we think that the trend of the work shows that we must operate very close to normal pressures; the true point will be very close to zero, so close as to make the altitude of a district in which we may wish to instal a plant, a vital question. We are now operating at about eight hundred feet above sea level.

This long explanation has been made necessary by the one thing that we are deliberately reiterating, over and over again in the hope that the world will correct it for its own good—namely, lack of facilities.

To return now to our drawing (page 143) with its five animals to a section, instead of ten animals as called for by the plan.

We chose the five best animals in each section and based our curves on these.

There is one very remarkable characteristic shown by these curves and we wish to dwell on it at length, because it seems to mean that we are here very close to success; in fact and in reason, it can mean nothing else.

In turning back and taking up the study of that primary foundation of the work, the previously oxidized or ⊕ animals, it will be found that in the first two experiments (EXPERIMENT 1–14–10 and EXPERIMENT 8–4–10) the ⊕ animals fell, that is lost weight, immediately after the inoculation. This is clearly demonstrated in CHART NO. 3—EXPERIMENT 8–4–10, page 31, where the different quantities of gas were being investigated. It should be borne in mind that the ⊕ animals there carried in one per cent. of gas had been, just previous to inoculation, carried in two per cent., which will account for their slight rise in weight during the early stages of the experiment, as the gas strain was lightened on these.

Now, passing by the November Experiment for the reason that it carries no properly oxidized animals, and turning to the various drawings of the oxidized animals passing through the process in the First May Experiment, EXPERIMENT 5–4–11 (CHART NO. 6 on page 64 will well demonstrate the point, although it is apparent in all the charts of the oxidized animals), it will be seen that all these animals rose strongly in weight immediately after inoculation.

In the first two experiments we were drawing the air through the generators and operating at full voltage. In the May Experiment we were still drawing the air, but were down ten per cent. in voltage, due to insulation troubles.

On looking now at the Nitrogen Experiment, CHART NO. 2, on page 130, it will be seen that the oxidized animals in the upper pair of curves, the animals under the regular process, increase in weight after inoculation. Here we compressed the air and carried full voltage.

With the fact firmly impressed upon our minds that during the first two experiments, when our machinery operations were nearly, if not quite, identical with the operations in this experiment up to the time when we changed the leaky generator; that the oxidized animals in the first two experiments lost weight immediately after inoculation and later (in the First May and the Nitrogen Experiments) when we had radically changed our machinery operations, they rose in weight immediately after inoculation, we will turn back to our drawing on page 143.

The check animals, not in any way under the influence of the process, rise after the inoculation. The natural animals under the process fall *slightly* after the inoculation.

The oxidized animals, ⊕, *fall heavily after the inoculation.*

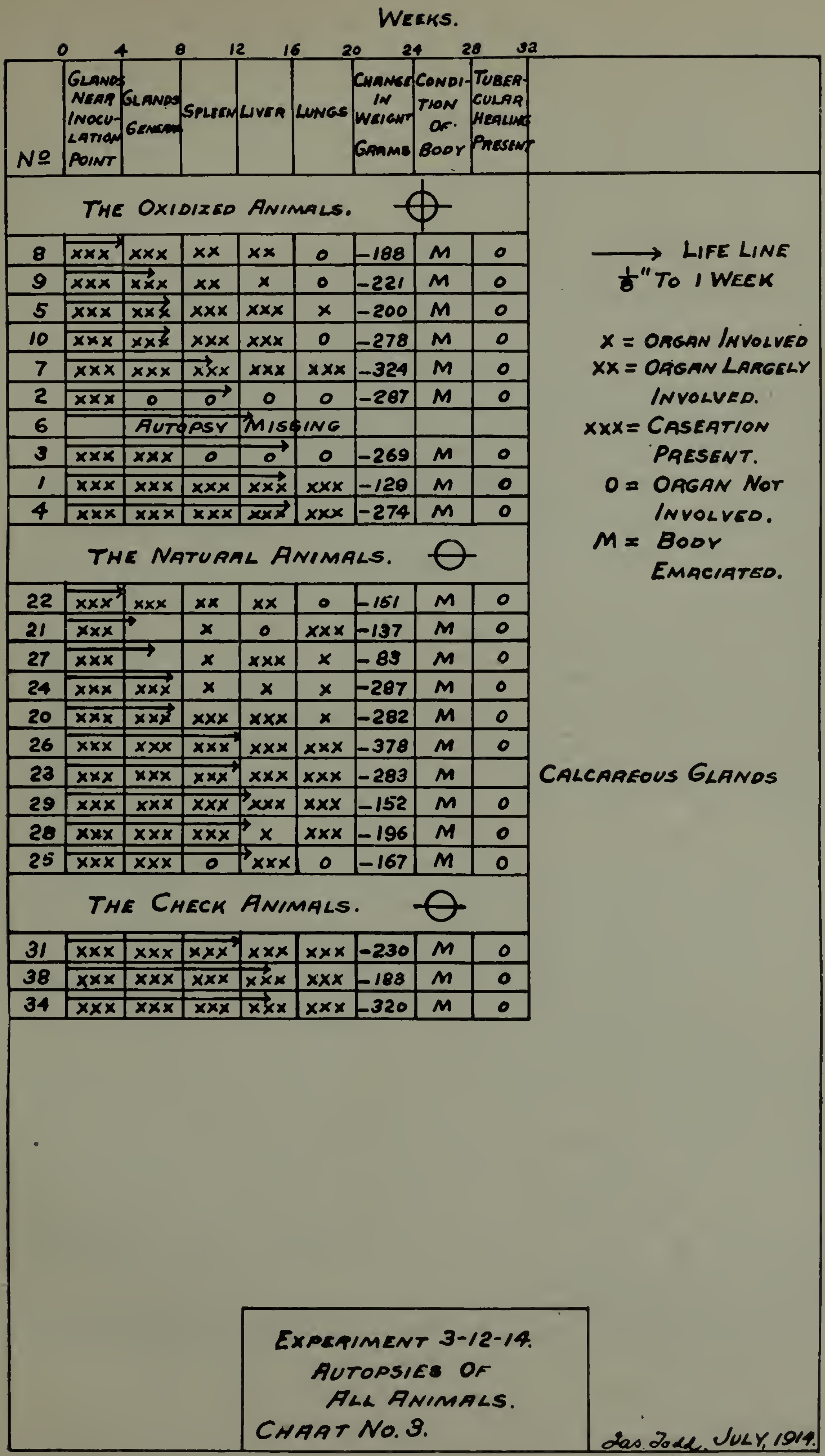
Thus we pass by gradations from the check animals to the oxidized ones and we find the mark that cannot be mistaken—the falling weight curve just after inoculation, *the character of a weight curve.*

There have been different forms of oxygen used in the different experiments and those that were successful in the first two experiments caused the ⊕ animals to lose weight immediately after their inoculation, while those that were not so successful (as in the ⊕ animals in the First May Experiment and the Nitrogen Experiment) caused a gain in weight immediately after inoculation while in this experiment the ⊕ lose weight immediately after inoculation and so seem to prove that our problem is close to solution.

There is no other explanation that is tenable to one's reason; and our experiment, instead of being a failure, is on the very verge of success, only the position is very vital and we must be careful, for a little too much tension to the air may mean death.

The rest of the drawing, as well as the autopsies on page 149, is left for consideration without comment, except that in the case of the autopsies we would draw attention to the fact that quite a number of the animals under the treatment either were not attacked in the spleen and liver or only slightly so, while the check animals were strongly tubercular throughout.

When we abandoned the experiment, we did not have autopsies performed on the remaining check animals.



WEEKS.

0 4 8 12 16 20 24 28 32

Nº	GLANDS NEAR INOCULATION POINT	GLANDS GENERAL	SPLEEN	LIVER	LUNGS	CHANGE IN WEIGHT GRAMS	CONDITION OF BODY	TUBERCULAR HEALING PRESENT
THE OXIDIZED ANIMALS. ⊕								
8	XXX	XXX	XX	XX	0	-188	M	0
9	XXX	XXX	XX	X	0	-221	M	0
5	XXX	XXX	XXX	XXX	X	-200	M	0
10	XXX	XXX	XXX	XXX	0	-278	M	0
7	XXX	XXX	XXX	XXX	XXX	-324	M	0
2	XXX	0	0	0	0	-287	M	0
6		AUTOPSY	MISSING					
3	XXX	XXX	0	0	0	-269	M	0
1	XXX	XXX	XXX	XXX	XXX	-128	M	0
4	XXX	XXX	XXX	XXX	XXX	-274	M	0
THE NATURAL ANIMALS. ⊖								
22	XXX	XXX	XX	XX	0	-151	M	0
21	XXX		X	0	XXX	-137	M	0
27	XXX		X	XXX	X	-83	M	0
24	XXX	XXX	X	X	X	-287	M	0
20	XXX	XXX	XXX	XXX	X	-282	M	0
26	XXX	XXX	XXX	XXX	XXX	-378	M	0
23	XXX	XXX	XXX	XXX	XXX	-283	M	
29	XXX	XXX	XXX	XXX	XXX	-152	M	0
28	XXX	XXX	XXX	X	XXX	-196	M	0
25	XXX	XXX	0	XXX	0	-167	M	0
THE CHECK ANIMALS. ⊖								
31	XXX	XXX	XXX	XXX	XXX	-230	M	0
38	XXX	XXX	XXX	XXX	XXX	-188	M	0
34	XXX	XXX	XXX	XXX	XXX	-320	M	0

CALCAREOUS GLANDS

⟶ LIFE LINE
1/8" TO 1 WEEK

X = ORGAN INVOLVED
XX = ORGAN LARGELY INVOLVED.
XXX = CASEATION PRESENT.
0 = ORGAN NOT INVOLVED.
M = BODY EMACIATED.

EXPERIMENT 3-12-14.
AUTOPSIES OF
ALL ANIMALS.
CHART NO. 3.

Jas. Todd. JULY, 1914.

THE PRINCIPLES INVOLVED IN THE PROCESS

We have said that we would show that there is but one line of reasoning which can be applied to this work as a whole and be satisfying. Until we have the true reasoning, we are almost hopelessly involved in prejudice and ignorance, so it becomes vital that we put ourselves in a position to think correctly on the subject of our process.

The weight of this work is bound in the end to bring out the true reasoning, providing it has been, on the whole, well designed and carefully carried out. It must bring about this result by showing, step by step, the fallacy of a wrong reasoning, as well as bringing out, step by step, the true reasoning. We have at hand nearly six years of work and six main experiments, as well as much additional information of value, and if there is a trend to our experiments we should surely be able to locate it by now.

When we started this work, we did so because we saw oxygen in such complete control of our bodies as to show that nature relied upon it to a wonderful extent in her work. Very tersely stated, we saw oxygen entering our bodies through both our food and our lungs. We saw a major organ of the body, the lungs, given up to the introduction of oxygen into our blood and the removing of the results of its introduction; in addition to this we saw every other element, when its power had been consumed by the body, removed by being combined with oxygen. All this led us to believe that if we could control the introduction of this element into our bodies, we would, of necessity, be able to play upon our condition much as a violinist may play upon his instrument.

Even at the start we fully recognized that we must overcome normality; that to accomplish our purpose, either the body or the element must be intensified, and so we chose so-called ozone as the most practical form of intensified oxygen. Undoubtedly by a rare chance we operated our machinery correctly during the first two experiments, although we then had no idea of anything deeper than "ozone" being involved in the process. Then, just as surely as our machinery commenced to operate in new paths, we drifted away from what had appeared sure ground and the first thing we knew we had no anchor and no reasoning that brought results, but gradually, although very dimly at first, we commenced to grope and then to see, and that which has become so clear to us we wish to impress upon our reader. It is a strange story, however, because it is entirely new—*that oxygen can and does take many different forms*, that some of these various forms can aid us little if any (see the November Experiment); that others can aid us a good deal (see the First May Experiment); and that there are yet others that can almost remove the terror of disease and suffering from the human race (see the January Experiment).

The proof of this state of affairs is perhaps best stated by negation; by the statement that any other line of reasoning that we have ever seen applied to the work *becomes untenable before the facts of the work*, which are fortunately sufficient for this purpose.

For instance, take the position that peroxide of nitrogen is the vital principle and one meets the proof that all the wonderful success of the First May Experiment was attained with no nitrogen compounds present, yet tubercular healing was present in this experiment and seventy-two weeks of life after inoculation.

Go farther and say, as we have heard it said, that the oxidizing gases have nothing to do with the results and that the benefits are entirely due to the large quantity of fresh air driven in on the animals, and we are met by the facts of the "Air Blast" experiment, where this question was investigated and where the animals placed under a blast of pure air died more rapidly than the check animals; and if we follow such reasoning past this obstacle, we will find, possibly to our surprise, that we are stopped by the whole of the facts developed by the work on nutritive oxidation, and still further on we meet the ⊕ animals and then we are overwhelmed.

But it is not for us to undertake to meet every possible criticism of our work before it is made, but rather to state that if it is undertaken to explain these experiments by any other line of reasoning than the varying forms of oxygen, we soon run aground; our reason is not satisfied, things do not do what they seemingly ought to do, while from the moment we assume that oxygen is "acting" as we say, everything becomes clear and one feels that he is on firm ground, although there is still much truth to be discovered.

As to clear evidence of what we claim; there is some of that too. For instance, why do the weight curves of the previously oxidized animals of the first two experiments all fall just after inoculation, while the lines of the First May and the Nitrogen Experiments rise after inoculation, and then, when we return to the original mechanical operations in the last experiment, the lines again fall, *if we were not making a different form of oxygen at the first and the last from that used in the intermediate experiments?*

These facts cannot be overlooked as they are real evidence and demonstrate a point to which we have frequently referred; the character of a weight curve rather than its detailed changes.

There has been a good deal of discussion as to what this process, with its clear marks of radicalism, means in its operations within the living body Of course the writer can give no information on this point, as he is not trained to enter the living body and is well content to stand and study it by its external evidences, but Doctor Todd has given an explanation that is at least clear and simple and one which appeals as only a reasonable explanation can.

He considers it a process of elimination in the sense that when active oxygen enters into the living processes they move more rapidly and unerringly and so, by eliminating the spent elements, make room for the following ones to act; much perhaps as when we open the damper on a boiler chimney, the burnt gases are carried away to be replaced by fresh heat, the steam pressure rises, but no injury is done, as we are acting well within the factor of safety.

THE SIGNIFICANCE OF THE AUTOPSIES

We now intend to prove the radical benefits of this process from a source we have not yet used.

When we first commenced this work, we were totally ignorant of the significance of the autopsies; those who performed them could tell us nothing of value except as to the presence of tubercular healing, but it is of necessity a long distance for the deliberate man who assails a problem such as this, from the tubercle bacilli in unopposed control to the tubercle bacilli destroyed, and the path must be devious and the steps must each be a seat for reason and so we have closely studied these autopsies for there was something very remarkable about them, and only now, at the close of nearly six years of work, do we feel that we are able to extract something of their truth for the good of the process.

In the first place, that they are capable of being critically studied is due to their being put in the form of drawings where great numbers of them come under the eye at once, otherwise they would be hopelessly involved by their numbers alone. And, for this reason, we must urgently insist upon the necessity of a thorough understanding of the markings used on the autopsy drawings, in order that the evidence given may be readily followed.

In turning back to the drawing containing the autopsies of the animals from the first experiment (EXPERIMENT 1–14–10, page 21), there will be found the autopsies of the four animals under the treatment. The first three are ⊕ animals and the last, No. 9, is ⊖.

The characteristic that has attracted our attention so frequently to these four autopsies is the fact that the ⊖ animal has all his organs involved while the three ⌖ animals have no general involvement, being very slightly affected in the lungs and in one case in the liver.

We have the autopsies of several hundreds of animals and can therefore make a thorough investigation and see what evidence is to be found in support of the three following questions which are vital to us.

The three questions we will ask are:

FIRST—IS OXIDATION BENEFICIAL TO THE LIVING BODY?

SECOND—HAVE WE ACCOMPLISHED PRACTICAL OXIDATION?

THIRD—ARE WE NEAR TO SUCCESS IN OUR WORK?

The natural action of tuberculosis on the guinea pig is very definite and so gives us stable ground for our investigation through the check animals. First the glands around the point of inoculation are attacked and destroyed, then the germs spread to the glands throughout the body and destroy them.

Following the attack upon the glands general, the spleen and liver are attacked and destroyed; still later the lungs are attacked, although not by any means in all cases. The other organs are rarely involved.

The proposition which we purpose considering is based upon the fact that in unopposed tuberculosis in this animal, after a period of three months from the inoculation the germs have had sufficient time to break down the resistance of the spleen and the liver and to largely destroy these vital organs. Now if the answer to these three questions under investigation, as regards the autopsies, is in favor of the process, then on animals living, say twelve weeks or longer, we will find the spleen and liver of such check animals heavily involved, while we find many cases among the animals undergoing the treatment in which these two organs are either not attacked or only slightly involved.

Of course, we must allow, at least in the check animals, for evidence of what we might perhaps call "individual resistances"; in other words, in such a complicated question as the living body we must not expect to find an absolutely perfect record, but we must, nevertheless, have the strong weight of the evidence on our side before we can assert the claim of proof, because the burden of proof is upon us. In making this test of our work, we must eliminate all the earlier experiments because in them the check animals lived less than the twelve weeks, which we have determined as the time necessary to fully develop the disease in these organs. One can, if he chooses, follow the question through the great number of animals used in the First May Experiment (EXPERIMENT 5–4–11), by making proper allowance for the length of life in each animal, remembering that the longer the animal lives the heavier the involvement should be, as the germs have had more time to destroy.

In order to be brief we shall confine ourselves to the last experiment (EXPERIMENT 3–12–14). Take CHART NO. 3, on page 149. Here are the autopsies of the animals in the experiment. On investigation of the three check animals, it is seen that the spleen and the liver are marked XXX, showing tubercular destruction. But, on examination of the natural animals under the treatment, there are some exceptions in the record of the liver and spleen. When we now turn to the ⌖ animals under the treatment we find number 2 and number 3 with a clear record, as neither the spleen, the liver, nor the lungs have been attacked.

This, however, is by no means the best experiment with which to demonstrate this point. The autopsies in the Nitrogen Experiment, page 138, show us animals No. 1 and No. 2 living sixty weeks and the liver and spleen in one not attacked, in the other but slightly involved; these are ⌖ animals; here (page 139) will also be found evidence of the same kind in animals numbers 53, 64, 62 and 61, supporting the view that the nitrogen problem requires a fuller investigation.

In reverting to the First May Experiment and examining the autopsies of those hundred and fifty-odd animals closely, and then turning to the plan for their identification by numbers, it will be found that many of the best ones are ⌖. When the greater number of ⊖ animals used is taken into consideration, this becomes remarkable.

Our three questions are, undoubtedly, answered in favor of the process from an absolutely unbiased source—the facts of the autopsies—because we find that the liver and spleen in the previously oxidized animal has resisted the attack of the germ as is never found to be the case in the check animal and rarely in the ⊖ animal under the treatment.

THE THIRD SECTION

NUTRITIVE OXIDATION

We now leave our animals to take up the work which we have done in the oxidation of man. This portion of our work was commenced in February, 1911, and is still being carried on with steadily increasing success.

During this period we have had several hundreds of human patients suffering from a great many different diseases, but for the purposes of demonstration we have used but three diseases, tuberculosis, Bright's disease and diabetes, as in these three diseases we find characteristics which enable us to escape the snare of various opinions. Tuberculosis being a wasting disease, the weight changes become a reliable guide while both the other diseases can be well judged by the changes in the urine.

The reader will probably be disappointed at the small number of cases that we cite in detail, but he should remember that our work has had to be done under greater difficulties than he can possibly have any conception of. We have had no authority to enforce our wishes and the case has been rare indeed in which both the physician and the patient have given us the information to which we had a right.

Our plan for accomplishing nutritive oxidation was as follows:

We would add a certain quantity of active oxygen by chemical combination to a harmless, digestible, organic material. For this purpose we chose olive oil. We have oxidized several other oils as peanut, cotton-seed, castor, cod liver and corn oil, but have been able to test only the one on human beings until within the last year;

lately we have been using oxidized cod liver oil with good success. Our object in combining oxygen with the oil was to get what we might call additive oxidation; a form of oxidation which while being definitely attached to the oil molecule, yet would not be nearly as strongly held as the oxygen within the original structure of the oil molecule.

Olive oil contains fourteen per cent. of oxygen, but it was not the normal oxygen of olive oil that could aid us. What we required and planned to the best of our ability to obtain was oxygen attached so firmly to the structure of the oil molecule as to remain permanent while passing through the stomach and the intestines, and yet so lightly held as to free itself to the more vital reactions of the blood itself.

Oxidized olive oil is exceedingly difficult to make and purify, but we have succeeded in developing a successful process and now keep a supply of the oil always on hand. Experience has taught us that it should not be used longer than fifteen days after it is made, for although it does not lose its excess oxygen, or spoil, yet it seems to lose the availability of the active oxygen.

Up to this time we have been supplying the oxidized oils free of charge and shall continue to do so for the present, but eventually this course will have to be changed. Nothing definite has as yet been decided upon, but the tendency, if the work with the oxidized oils continues, is towards a plan by which we shall charge a fair price for this material on the market. The money so obtained will be used solely for the purpose of developing our problem and not in any way for personal profit. Some practical method will be devised by which those unable to pay can be supplied.

The following analyses of olive oil, both before and after its oxidation, plainly show the result accomplished:

Olive oil before oxidation:

	Per Cent.
Carbon	74.37
Hydrogen	11.37
Oxygen	14.22
Nitrogen	.04

The same oil after oxidation:

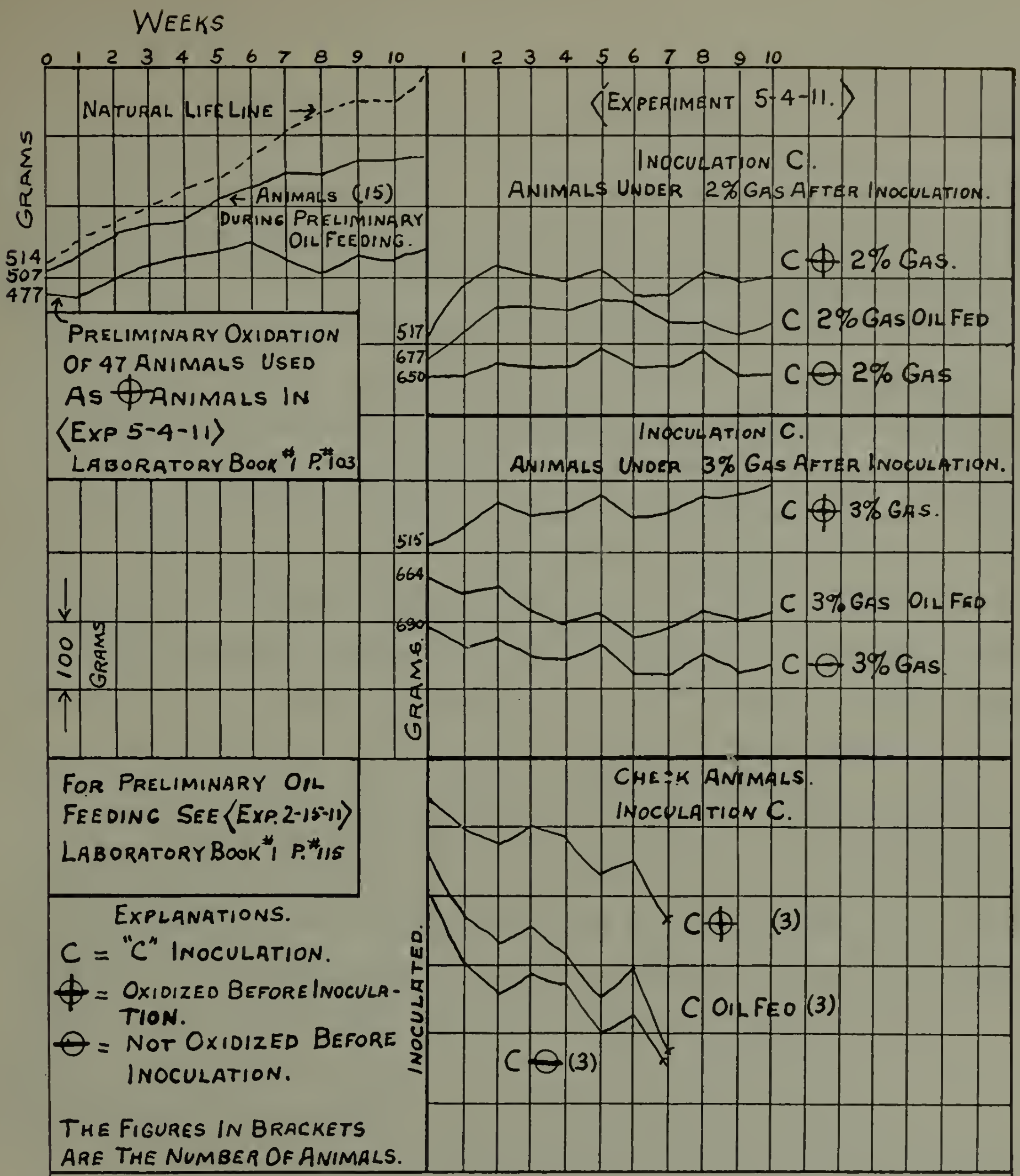
	Per Cent.
Carbon	67.21
Hydrogen	9.98
Oxygen	22.75
Nitrogen	.06

The oxygen is increased 8.53 per cent. at the expense of the carbon and hydrogen and this increase is what we call "available oxygen." The 14.22 per cent. of oxygen contained in the natural oil is what we call normal oxygen and as such is incapable of utilization for our purpose.

We shall now take up in regular sequence that which has happened and dispose of it as rapidly as possible, confining ourselves strictly to the facts.

As a section of the first May Experiment (EXPERIMENT 5-4-11), we carried on the preliminary work with the animals by feeding them three drops of oxidized olive oil twice each day for eleven weeks prior to their inoculation. This was done for the purpose of determining whether we could accomplish preliminary oxidation with the oil. The animals were later exposed to the ordeal of the inoculation in comparison with both the gaseous oxidized and natural animals. None of the animals were fed any of the oxidized oil after their inoculation on account of the great danger of infection to the experimenter.

On page 161 we place CHART NO. 1—OXIDATION THROUGH THE NUTRITIVE SYSTEM.



OXIDATION THROUGH THE NUTRITIVE SYSTEM.

THE HISTORY OF FIFTEEN ANIMALS WHICH WERE FED OXIDIZED OLIVE OIL (SP. GR. 1.000) 3 DROPS TWICE A DAY FOR 11 WEEKS UNDER 〈EXP. 2-15-11〉 THEN INOCULATED WITH "C" INOCULATION (25 MILLION GERMS), DIVIDED INTO THREE CLASSES AND CARRIED THROUGH 〈EXP. 5-4-11.〉.

OXIDATION THROUGH
THE NUTRITIVE SYSTEM.
CHART #1.

Jas. Todd JULY, 1911.

On this drawing we have placed on the left and at the top the weight curve of the fifteen animals during the period they were being treated with the oxidized oil. This weight curve of the so-called "Oil Fed" animals is placed in the middle between the dotted natural weight curve and the curve of the forty-seven animals, oxidized by gas, for use in the main experiment. The evidence of accomplished preliminary oxidation is not clear, but there is enough to show that the curve does not rise as fast as the natural life line. This is always the case with preliminary oxidation. Toward the end the curve moves away from the natural growth line. It then has a characteristic which experience has shown us is necessary to successful preliminary oxidation—the falling of the curve a little from the seventh to the eighth week.

The lower gaseous oxidation curve falls during this period. In following this "oxidation dip" through the records it is always found, with the possible exception of very young animals having a strong natural growth line which may overpower this indication of oxidation. After inoculation the curves are undoubtedly conflicting.

The animals were divided into three sets of five each; one lot as check animals; one lot in two per cent. gas treatment; and one lot in three per cent As check animals the curves go with the natural ones rather than with the oxidized ones.

In three per cent. of the gas the curves also associate themselves with the natural animals, but it must be remembered that three per cent. of the gas is being used and that while the gaseous oxidized animals pass from two up to three per cent., the natural and the "Oil Fed" animals pass from no gas directly to the three per cent. The predominant change is great, the same in both, and it seems natural for them to keep together.

When we examine the curves of those placed in two per cent. of the gas after inoculation the results are strikingly different, for here they rise with full force. Their weight curve departs from the curve of the natural animal and shows all the characteristics of the animals oxidized with the gas. The evidence is clear, showing every proof of preliminary oxidation having been accomplished by means of the oxidized oil.

We place on page 164 a drawing showing the complete autopsies and length of life of the fifteen animals involved.

On the three following drawings are the individual animals; first as check animals and then in two and three per cent. of the gas. It will be noticed that Animal No. 124 is one of the three animals from the whole experiment that lived more than a year. His complete curve is shown on the separate drawing of these animals facing page 96. After death, tubercular healing, in the form of calcareous glands, was found by the autopsy of this animal.

We turn to CHART NO. 22—RESISTANCE TO TUBERCULOSIS ESTABLISHED, EXPERIMENT 5–4–11 on page 102. Here are the plain life lines of these animals in comparison to the rest of the May Experiment and a glance will show a greater toughness, as shown by the increased longevity. For instance, three of the five "Oil Fed" check animals live to eight weeks while but four of the other forty-one do so, also the first death occurs in those under treatment after quite a number of deaths have occurred in the others. These traits, however, are not as valuable as one would think at first glance, for all the "Oil Fed" animals should class as "oxidized animals" and so tend to a longer life, while the others give no clue on the drawings as to whether they were ⌖ or ⊖, yet to so class them accomplishes our purpose. However, taken in connection with the other animals placed under the gaseous treatment, the life lines of the nutritive oxidation animals undoubtedly stretch out better. Such evidence is not of itself conclusive but when taken as a part of the whole, adds strength to the case.

WEEKS.

0 4 8 12 16 20 24 28 32 36 40 44 48 52

No.	Glands Near Inoculation Point	Glands General	Spleen	Liver	Lungs	Change In Weight Grams	Condition Of Body	Tubercular Healing Present
Check Animals.								
141	xxx	xxx	x	x	0	-303	M	0
143	xxx	xxx	x	x	0	-249	M	0
144	xxx	xxx	xx	xxx	0	-323	M	0
140	xxx	xxx	xx	x	0	-283	M	0
142	xxx	xxx	x	0	0	-284	M	0
Animals Under Treatment.								
133	xxx	xx	xx	xx	xxx	-295	M	0
123	xxx	xxx	xxx	xxx	xxx	-270	M	0
132	xxx	xxx	xxx	xxx	xxx	-188	M	0
121	xxx	xxx	xxx	xxx	xxx	-215	M	0
122	xxx	xxx	xxx	xxx	xxx	-124	M	0
134	xxx	xxx	xx	xxx	xxx	-113	M	0
131	xxx	xxx	xxx	xxx	xxx	-169	M	0
120	xxx	xxx	x	xxx	xxx	-200	M	0
130	xxx	xxx	xxx	xxx	xx	-152	M	0
124			0	xx	0	-81	M	YES

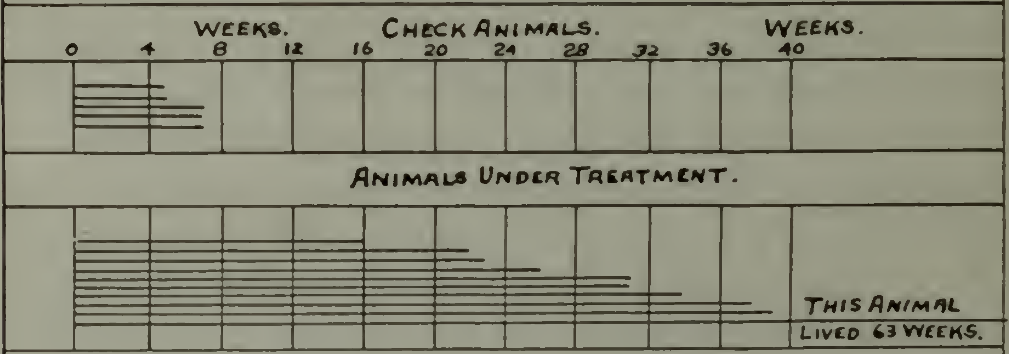
This Animal Lived 63 Weeks
Glands Calcareous.

→ Life Line
$\frac{1}{8}''$ = 1 Week.

x = Organ Involved.
xx = Organ Largely Involved.
xxx = Caseation Present.
0 = Organ Not Involved.
M = Body Emaciated

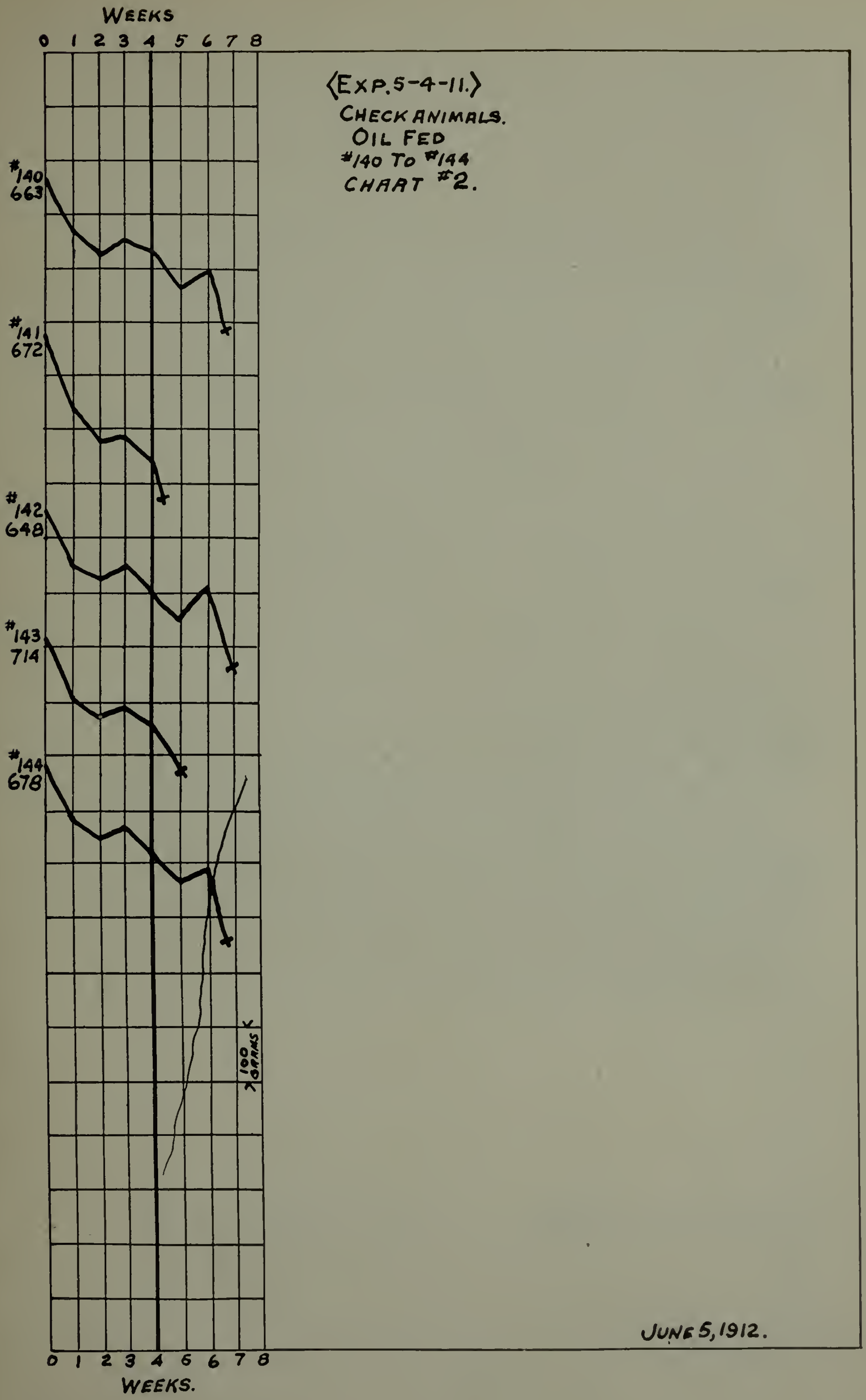
"C" Inoculation.

LIFE LINES $\frac{1}{8}''$ = 1 WEEK OF LIFE AFTER INOCULATION.

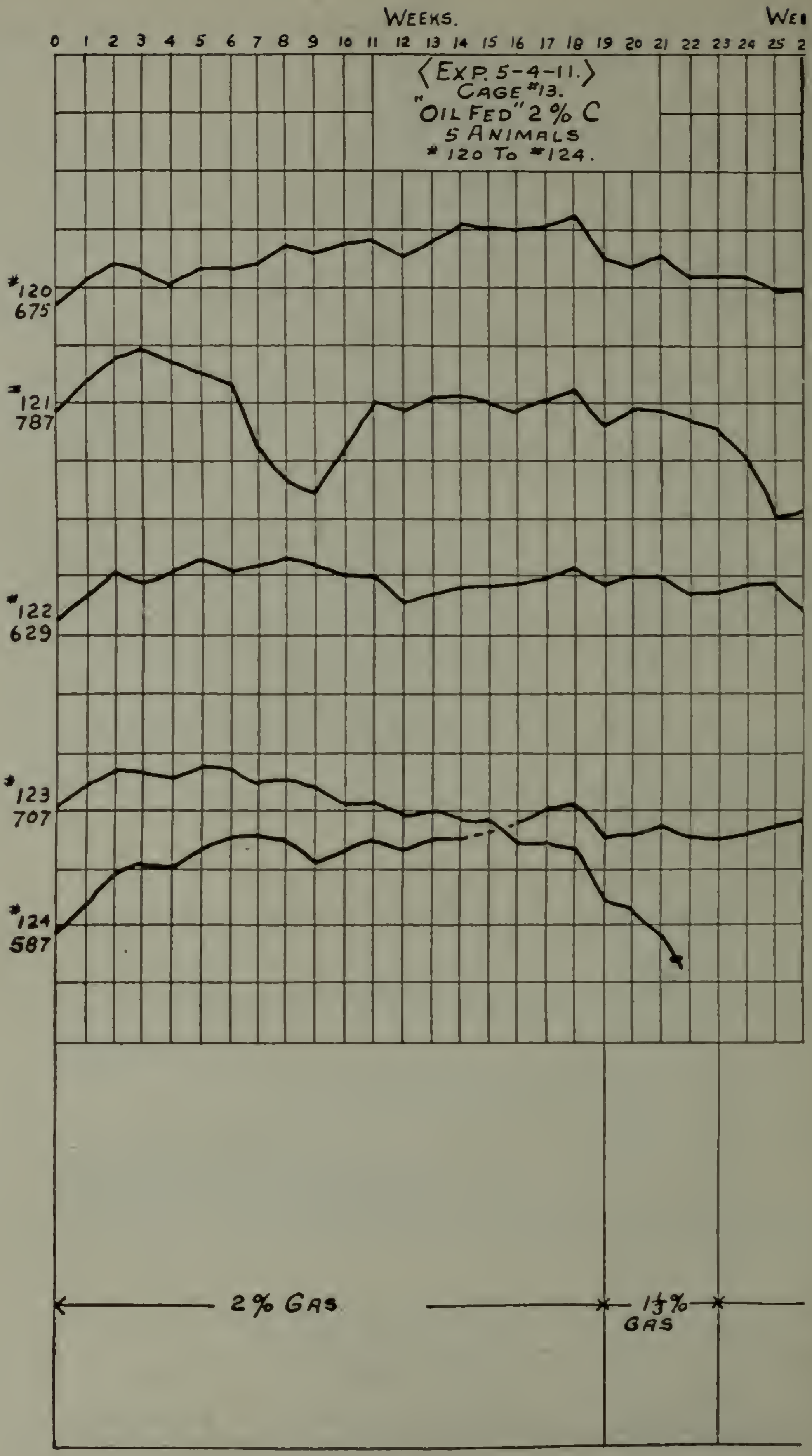


EXPERIMENT 5-4-11.
OXIDATION THROUGH THE
NUTRITIVE SYSTEM.
AUTOPSIES & RESISTANCES.
Jas. Todd. FEBRUARY 1913.

CHART #5.


WEEKS
0 1 2 3 4 5 6 7 8
⟨EXP. 5-4-11.⟩
CHECK ANIMALS.
OIL FED
#140 TO #144
CHART #2.
#140
663
#141
672
#142
648
#143
714
#144
678
100 GRAMS
JUNE 5, 1912.
0 1 2 3 4 6 6 7 8
WEEKS.

(12)


WEEKS.
WE
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 2
⟨EXP. 5-4-11.⟩
CAGE #13.
"OIL FED" 2 % C
5 ANIMALS
# 120 TO # 124.
#120
675
#121
787
#122
629
#123
707
#124
587
2 % GAS
1⅓%
GAS

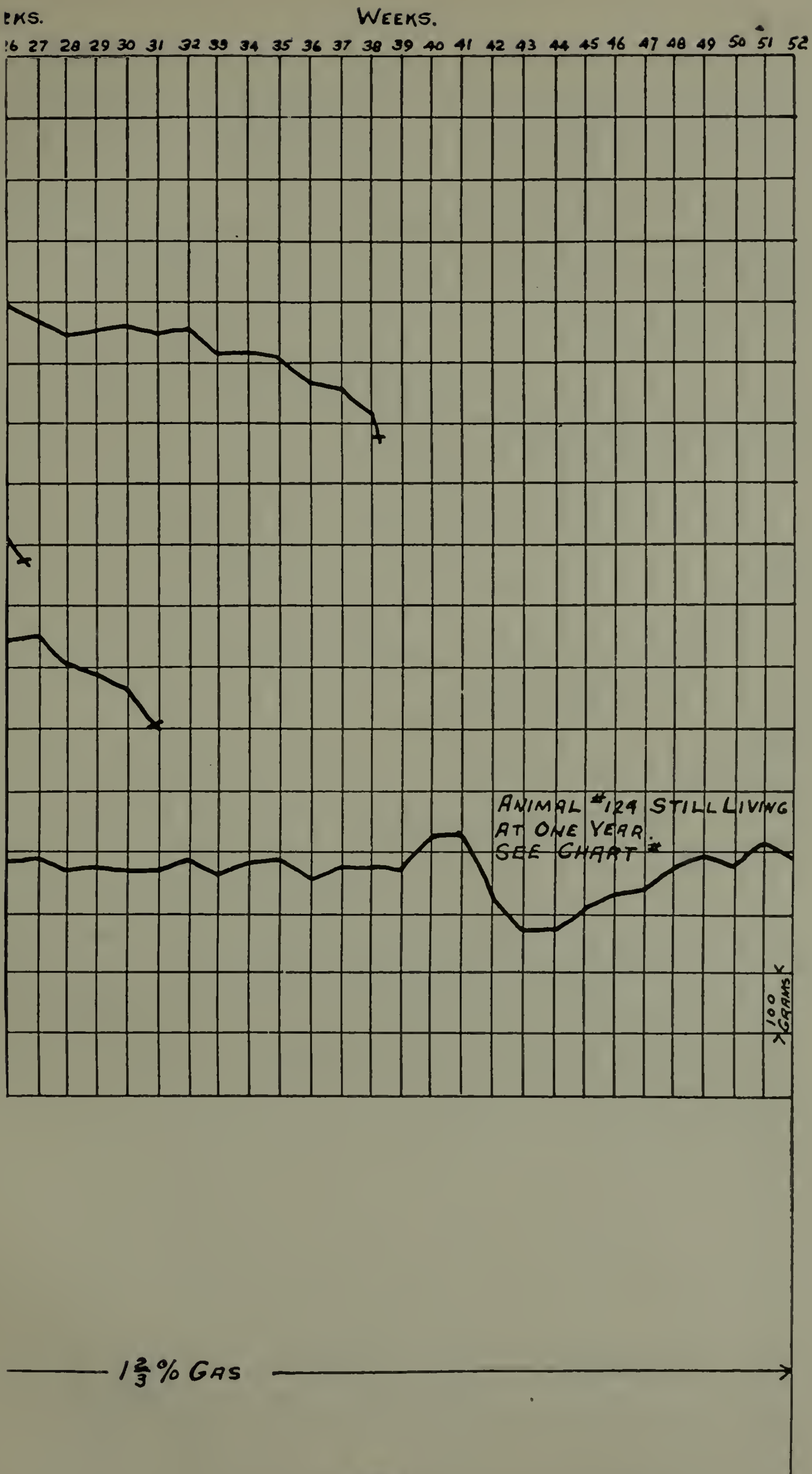
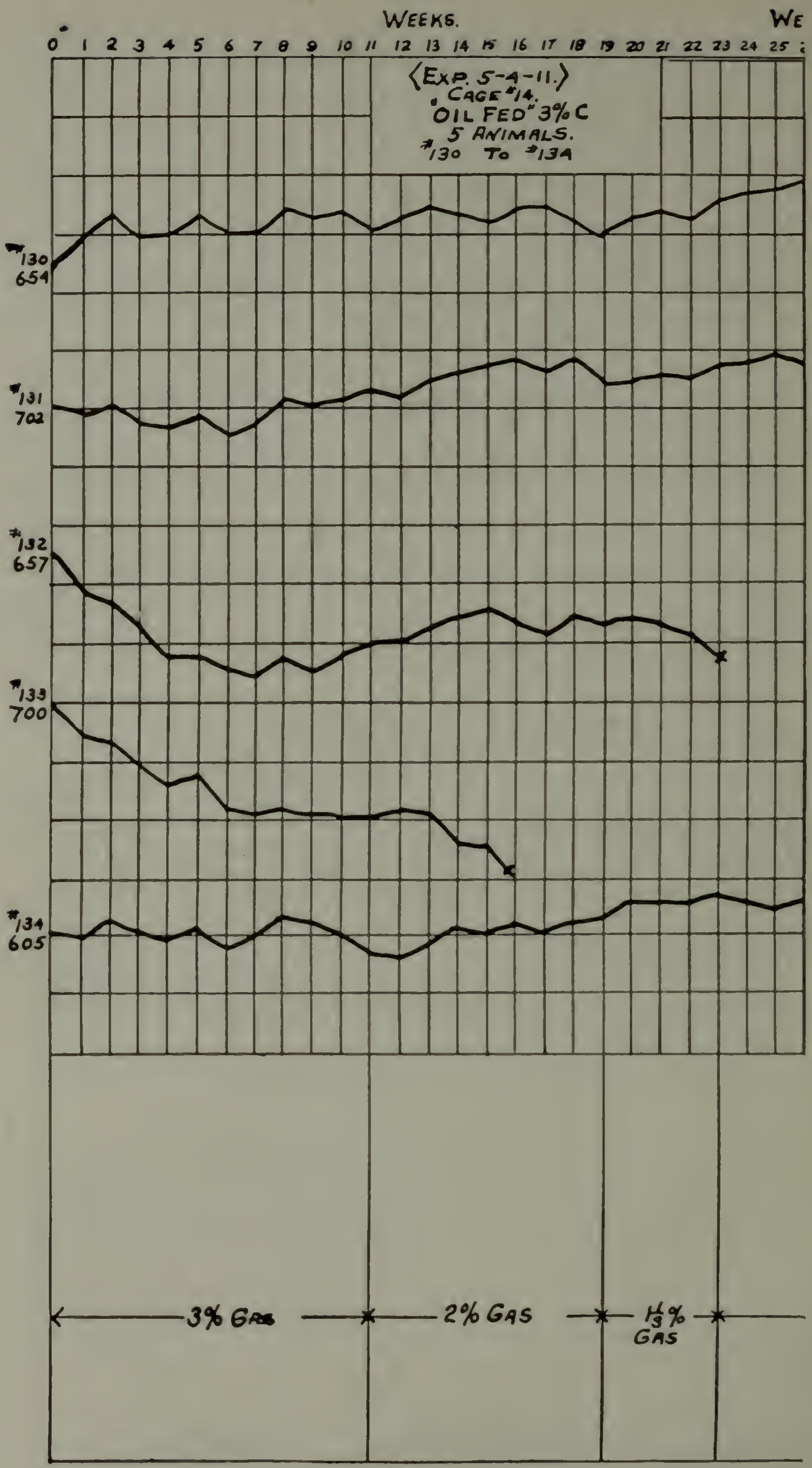


CHART #3. JUNE 5, 1912.


WEEKS.
WE
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
⟨EXP. 5-4-11.⟩
CAGE #14.
"OIL FED" 3% C
5 ANIMALS.
#130 TO #134
#130
654
#131
702
#132
657
#133
700
#134
605
3% GAS
2% GAS
1/3% GAS

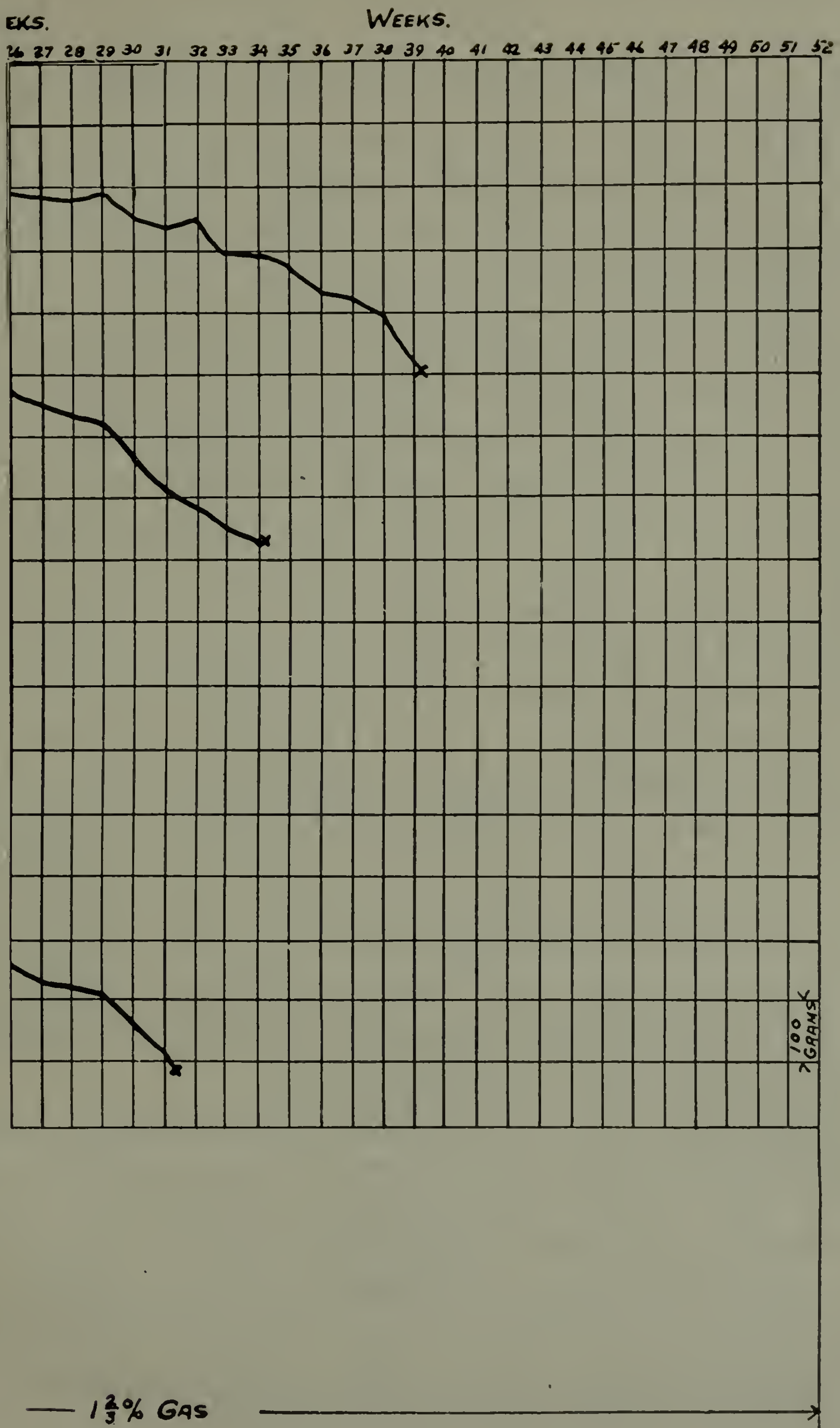


CHART #4. JUNE 5, 1912.

We now pass to the five animals inoculated and placed in two per cent. of the gas after their inoculation. For this purpose we use a drawing, Oxidation through the Nutritive System—Comparisons, page 171.

The upper curves carry the animal oxidized by gas through his preliminary oxidation, bringing out by a heavy cross line at the sixth week, what we call the oxidation dip. At the end of eleven weeks he is inoculated and carried forward. The solid curve shows the very wonderful evidence he gave of increased power to fight his enemy. The upper dotted curve after inoculation is the curve of the "Oil Fed" animals; the lower the natural ones, ⊖. On the lower part of the drawing, placed there to bring out the preliminary treatment of the "Oil Fed" animals, are the same curves after inoculation as above, only now the "Oil Fed" ones are in the solid line. The evidence seems clear and to the point in that the animals conform almost perfectly to the curve of the gaseous oxidized or ⊕ ones.

The drawings will well repay careful study, for the judgment formed cannot be other than that the animals were oxidized *and by nutritive oxidation*, perhaps only partially so, but certainly giving close conformity to those whose oxidation cannot be denied. So the change in a weight curve, twice found, caused us to advance in the hope that the higher organization of the human body would enable it to respond to the effort, *and it did.*

In considering the following human cases we wish to plainly state that, so far as we are concerned, we do not know from what they suffered and consequently we have no responsibility so far as the diagnosis is concerned. Each case, however, was diagnosed by one, and in some cases by as many as three physicians, and the treatment taken under their care. There is no reason whatever for doubting their findings; but we wish to emphasize the fact that we had nothing to do with this phase of the subject.

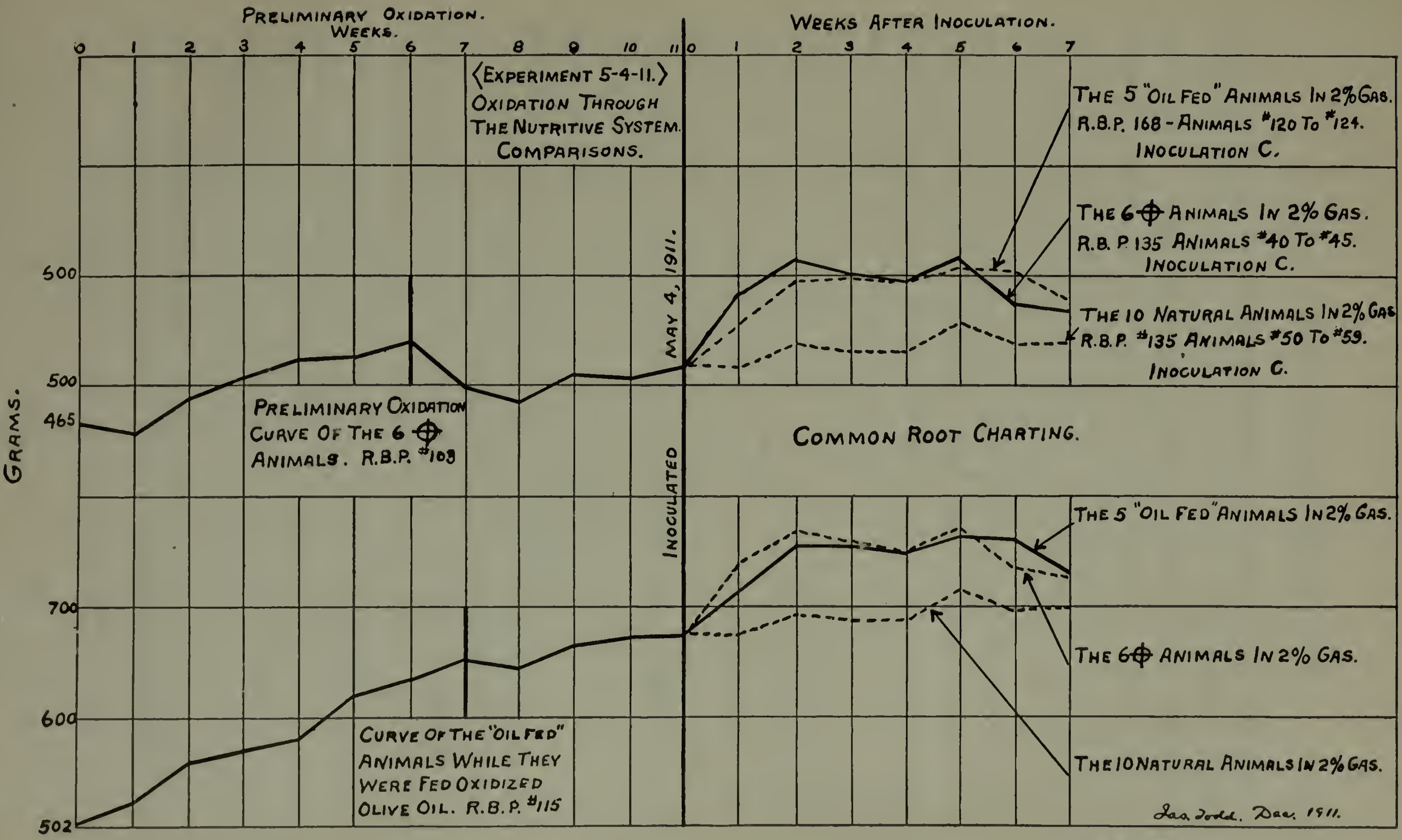

Preliminary Oxidation.
Weeks.
0
1
2
3
4
5
6
7
8
9
10
11
Weeks After Inoculation.
0
1
2
3
4
5
6
7
⟨Experiment 5-4-11.⟩
Oxidation Through
The Nutritive System.
Comparisons.
The 5 "Oil Fed" Animals In 2% Gas.
R.B.P. 168 - Animals #120 To #124.
Inoculation C.
The 6 ⊕ Animals In 2% Gas.
R.B.P. 135 Animals #40 To #45.
Inoculation C.
The 10 Natural Animals In 2% Gas
R.B.P. #135 Animals #50 To #59.
Inoculation C.
May 4, 1911.
Inoculated
Grams.
500
500
465
700
600
502
Preliminary Oxidation
Curve Of The 6 ⊕
Animals. R.B.P. #109
Common Root Charting.
The 5 "Oil Fed" Animals In 2% Gas.
The 6 ⊕ Animals In 2% Gas.
The 10 Natural Animals In 2% Gas.
Curve Of The "Oil Fed"
Animals While They
Were Fed Oxidized
Olive Oil. R.B.P. #115
Jas. Todd. Dec. 1911.

CHART #6.

The first three cases are given in the words of the physicians in charge of them.

PATIENT NO. 1—"Age fourteen, female, Austrian. Father died of tuberculosis. Mother living. Came to Presbyterian Hospital, March 6, 1911, on account of tuberculous disease of bones of both feet. Pulse 100, temperature ranged from 99 in the morning to 103 in the afternoon. Appetite was gone, skin bronzed, anemic, weight 58 pounds, very much emaciated. March 9, sinuses in feet were curetted and diseased bones removed. March 14, she was given oxidized olive oil, 20 drops after each meal, which was well borne. On March 17, the dose was increased to 40 drops or two capsules. On March 18, the oil had to be discontinued on account of nausea, loss of appetite, etc. On March 20, oil was resumed, 20 drops three times daily. Discharge from sinuses rapidly decreased, temperature declined in one week to 98 morning, 99.2 evening; appetite rapidly increased. April 6, she went out in park in wheeled chair and when weather did not prevent, spent her days in open air. She continued the oil, 20 drops after each meal, until April 22, when she left the Hospital, taking with her 4 ounces. At last account direct she was still taking the oil and gaining in weight. Her gain while in the Hospital was 12 pounds, from March 6 to April 22. When last inquired for she had been sent to an institution out of the city. During her stay in the Hospital she took the small quantity of 5¼ ounces and took away with her 4 ounces, consuming in all less than 10 ounces, yet her gain was marked and in my estimation more than would have resulted from the free drainage to her feet and the open air treatment which she received. When she left the Hospital all sinuses in the left foot were closed and all in the right foot save one."

PATIENT NO. 2—"Age twenty-four, female, American, weight 102 pounds, was operated for complete prolapse of rectum from which she had suffered for 12 years. She was very nervous, emaciated to an extreme degree, appetite poor, pulse low and temperature normal. On March 22, 1911, she began to take oxidized olive oil, 20 drops after each meal. This was well borne, no nausea, appetite not affected. On March 29, the dose was increased to 40 drops after each meal and on the evening and night of March 31 she suffered from an acute indigestion that was alarming on account of the violent vomiting and pain in the bowels. Oil was discontinued until April 5, when she again began with 20 drops after each meal. Digestion has not been interfered with in the least since that date. Weight has increased from 102 pounds to 124 pounds at present date, July 15, 1911. She has taken in all only 14 ounces of the oil and yet her improvement has been so great that all her friends remark on the change. While her health has been greatly improved by the correction of her trouble, her gain in weight certainly has been augmented by the oxidized olive oil. She will continue the oil indefinitely."

Both these patients had been operated upon and their cases affected by this fact to an unknown extent. The reader will please note that these first two cases are the only ones we give in which operations of any kind have been performed.

PATIENT NO. 3—"On September 16, 1911, this gentleman, aged fifty, came to my office complaining of feeling always tired, unfit for work, easily irritated, indifferent appetite and not feeling rested after sleep. He was given some general directions as to diet, exercise, etc., and no medicine. He was given a supply of oxidized olive oil and directed to take twenty minims in a capsule after each meal. At end of one week he reported by telephone that he was taking the capsules without any disturbance to the stomach or digestion, but was not cured. He was directed to continue the capsules regularly, which he did. In October he again reported to my office and showed improvement in the following respects: Gain in weight since September 16, six pounds—141 to 147. Appetite much better, sleeping well, irritability very much relieved, ready for work and able to accomplish what he undertook to do. Oxidized oil continued in same dosage. January 8, 9 and 10, 1912, he was confined to house on account of slight influenza but continued the oil until February 14, when he stopped because of sickness in his family which caused irregular times of eating. At present he considers himself to be in good health, enjoying his meals, sleeping well, free from colds, which for years have kept him constantly under care of nose and throat specialists, and a clear gain in weight of ten pounds, which cannot be attributed to any other source than the oxidized oil—since he has had no other treatment and no change in occupation."

The following letter relative to two cases of tuberculosis is a voluntary statement from a trained nurse who has had charge of the two cases cited. The first case was a very old and hopeless one. The second we know nothing of excepting that it was a bad case of bone tuberculosis. No member of our committee has ever met either the nurse or the patients upon whom she reports.

"April 23, 1915.

"*My dear Mr. Todd:* I want to thank you for sending me the application blank and will forward it to Mr. F., and from what your capsules did for Mr. McP., at————, I feel sure if any one afflicted would start in to take them before the disease has progressed too far, that it would effect a permanent cure. Of course in Mr. McP.'s case it did not have a chance, as his disease had progressed too far. When I nursed him I felt that it was only a matter of a few weeks for him in this world. That was a year and a half ago and I feel sure it was nothing but your capsules that has kept him here.

"As to Mr. W.'s condition. He had not been without a tubercular abscess for about one and a half years, until he began taking your medicine; I think he had 16 or 17 abscesses. He has had only one since he has been taking your medicine and that was last August. He has gained about twenty pounds, I think, and has gained a great deal in strength."

We now give the following case of tuberculosis.

L. S. Three Degree Road.

ORIGINAL EXAMINATION

July 3, 1915, pulse 110, temperature 99.2, respiration 24, weight 154.

Hacking cough, pain in arms, strength gone, sleepy but can sleep only on back. Dullness over both apices, increase of respiratory murmur all over both lungs. Normal weight was 187 pounds. Specimen of sputum taken and tubercle bacilli found to be present. Prescribed rest, stopped all work, sleep in open air in shade of tree, forced feeding eggs and milk in connection with ordinary diet. Gave oxidized cod liver oil three times a day.

EXAMINATIONS AFTER TREATMENT COMMENCED

Date	Pulse	Temperature	Respiration	Dose	Weight
July 10	104	99	28	25 drops	155
July 17	92	99	24	25 drops	158
July 24	86	98.3	22	25 drops	160
Sept. 11	76	98.2	18	25 drops	169½
Sept. 25	72	98.2	18	25 drops	172

This is a clear case of pulmonary tuberculosis in its early stages. While forced feeding, rest and outdoor living were utilized, yet they cannot account for such radical improvement as shown by the fact that the pulse, respiration and temperature became normal in less than three months, while the weight increased seventeen pounds.

The man was a farmer, so he originally had plenty of fresh air and country food.

We here reject a great number of recent letters that we have from individuals who have taken the treatment, because there are no physicians' reports to go with them, but there is no doubt of their trend for they all are voluntary and all speak of improvement or cure.

We next place before you the voluntary written statement of a physician reporting on a case of Bright's disease complicated by diabetes:

"November 11, 1915.

"*Dear Mr. Todd:* Mr. M———— presented a specimen of urine tonight, the first in nearly two months. On examination, I find his urine is normal—specific gravity 1.020, no albumen, no sugar, no precipitate. His weight is steadily increasing, so that at present rate it will soon be at his original stage."

We now utilize two letters from an eastern physician who has used the oxidized oils very largely but whose reasonable conservatism has prevented his expressing an opinion until after he had had many cases under observation for long periods. This man knows little of our work or our plans and these circumstances taken with his ability and prominence in his profession make his letters of great importance, as they are uninfluenced by any viewpoint other than the facts as he has found them.

"February 11, 1916.

"*Dear Mr. Todd:* Your letter of 9th inst. at hand concerning the increase of oxygen and I will keep my eyes open.

"As to your request for a general opinion of the influence of the oil in tubercular troubles, I would say that it seems to be of benefit in tubercular cases, certainly has delayed progress and shown certainly coincident gains on the whole.

"In the interstitial variety of nephritis the progress is delayed, albumen to some extent lessened.

"The anemia in these cases is abated to a large degree.

"One of the points of interest has been the retinal evidence of delayed progress.

"I believe the oil to be of assistance in metabolism.

"It seems as if the oil were the factor, as with the starting of the oil the gain starts also."

"March 16, 1916.

"*Dear Mr. Todd:* I enclose cards with reports on all cases being treated. I have made some changes in dosage as well as shifts.

"I discharged the Barrows child as it seems best not to be mixed up with coming operations. The gain in this child's condition was very satisfactory.

"In the case of the Blake child, we have a most remarkable change for the better. I wish you could have seen the before and after in this case.

"In the nephritic cases we are certainly maintaining our own in so far as the usual run in such cases go.

"I am satisfied also in the tubercular cases that, taking into consideration the handicap of weather and necessity of keeping indoors or be buried in snow, we are to be congratulated."

His free admission that he has found marked benefits from the use of the oxidized oils in radically different diseases can only be taken as proof of the fact that oxygen has raised the chemical forces of the bodies of his patients and so has reacted to their good.

In addition to the above we are citing five cases that have been diagnosed as Bright's disease. These cases are chosen not because they show the best results, but because they are the only ones in which we have succeeded in collecting sufficient data for use.

URINE COMPARISONS

Patient No. 4

	At start, 6–28–12	8–1–12	9–9–12	12–10–12	6–5–13
PHYSICAL EXAMIN'N:					
Volume, 24 hrs. c.c....	1,560	1,320	1,140	1,350	1,320
Solids, 24 hrs. grams..	33	40	50	57	46
Appearance	Slightly turbid	Turbid	Turbid	Turbid	Turbid
Sediment	Small	Heavy	Heavy	Heavy	o
Reaction	Slightly acid	Acid	Neutral	Slightly acid	Acid
Sp. Gr. at 60° Fr.	1.009	1.013	1.019	1.018	1.015
CHEMICAL:					
Urea, per cent.	.85%	1.10%	1.30%	.80%	.75%
Albumin	Strong trace	Trace	Trace	o	o
Sugar	o	o	o	o	o
Acetone	Present	Present	Present	Present	Present
Diacetic acid	o	o	o	o	o
Indican	Above normal	Present	Present	Present	Present
Blood pigment	Present	o	o	o	o
Diazo reaction	—	—	—	—	Negative
MICROSCOPICAL:					
Casts					
Granular	Few	Few	Few	Few	o
Hyaline					o
Cylindroids	o	Few	Few	Few	Few
Mucus	Slight	o	o	o	Many threads
Amorphous deposit ..	Phos'tes	o	o	o	Small amount
Red blood cells		o	o	o	o
Leucocytes	Occasional	Few	o	o	Very few
Crystals		Urates	Uric acid	Urates, uric acid	o
Epithelial cells	Many small and round	Many small	Many small	Few round, many small	Many squamous and round

In this case, as shown by the analyses, all albumin has disappeared. Blood pigment, which was present at the start, also disappears. The leucocytes are gradually disappearing and the indican is lowered. Note carefully that all casts have disappeared. The patient is reported to us as stronger and generally better. There was no change in diet, as the patient was on diet when we commenced the treatment.

Note that the changes are very radical and that they are all towards health. The treatment in this case practically covers one year. When we consider the facts, viz.: that the patient is essentially a frail woman, over fifty years of age and weighing at the start of the treatment but one hundred and two pounds, can any reasonable critic deny that this last analysis is normal?

URINE COMPARISONS

Patient No. 5

	At start, 6–12–12	8–13–12	9–18–12
PHYSICAL EXAMINATION:			
Volume, 24 hrs. c.c.	1,500	1,100	1,040
Solids, 24 hrs. grams		46	39
Appearance	Clear	Turbid	Turbid
Sediment	0	Abundant	Slight
Reaction	Acid	Acid	Slightly acid
Sp. Gr. at 60° Fr.	1.010	1.018	1.016
CHEMICAL:			
Urea, per cent	.80%	1.10%	.45%
Albumin	Trace	0	0
Sugar	0	0	0
Acetone	Trace	Present	Present
Diacetic acid	0	0	0
Blood pigment	0	0	0
Indican	None	None	None
Diazo reaction	—	—	—
MICROSCOPICAL:			
Casts			
Granular		0	Few
Hyaline	Few	0	
Cylindroids	Few	Many	Few
Mucus	0	0	0
Amorphous deposit	0	Phosphates	Abundant
Red blood cells	0	0	0
Leucocytes	0	0	Occasional
Crystals			Few phos'tes
Epithelial cells	Few	Few round, many small	Many small

This case is not so good, but notice that the albumin has disappeared. There seems to have been some trouble between the physician and the patient because the patient failed to obey instructions and did not take the oil regularly after she commenced to feel better. Furthermore, we understand that the case is one of old standing, whereas this treatment has been only for three months.

URINE COMPARISONS

Patient No. 6

	At start, 6-21-12	8-1-12	9-9-12	10-21-12
PHYSICAL EXAMINATION:				
Volume, 24 hrs. c.c.	720	1,660	1,200	1,680
Solids, 24 hrs. grams....		39	34	27
Appearance...........	Slightly turbid	Very turbid	Turbid	Turbid
Sediment.............	Slight	Slight	Slight	Slight
Reaction..............	Acid	Neutral	Slightly acid	Acid
Sp. Gr. at 60° Fr.......	1.019	1.009	1.013	1.008
CHEMICAL:				
Urea, per cent.........	1.30%	1.05%	.70%	.30%
Albumin..............	Trace	Trace	0	0
Sugar.................	0	0	0	0
Acetone...............	Present	Present	Present	Present
Diacetic acid..........	0	0	0	0
Indican...............	0	0	0	0
Blood pigment.........	0	0	0	0
Diazo reaction.........	Negative	Negative	Negative	Negative
MICROSCOPICAL:				
Casts.................				
Granular..........		Few	Few	Few
Hyaline...........	Few			
Cylindroids...........	0	Occasional	0	Numerous
Mucus................	Few threads	None	0	0
Amorphous deposit.....		Phos'tes	0	0
Red blood cells........	0	0	0	0
Leucocytes............	Occasional	0	0	0
Crystals..............		Phos'tes	Phos'tes	0
Epithelial cells.........	Many squamous	Round and many squamous	Round and many squamous	Occasional round

The condition of this patient was discovered when making a general examination to discover cause of indisposition. Note in this case, and generally throughout the cases, that when the quantity of urine is sub-normal, the treatment seems to raise it strongly toward the normal. In this case the albumin completely disappears as do the leucocytes, and aside from the casts, there are very slight evidences left of derangement, although the treatment has been for only four months.

Urine Comparisons

Patient No. 7

	At start, 3-8-12	3-29-12	4-30-12	P.T.L., 6-6-12	P.T.L., 9-18-12	P.T.L., 12-24-12
Physical Examin'n:						
Volume, 24 hrs. c.c.				Not given	Not given	Not given
Solids, 24 hrs. grams					Not given	Not given
Appearance	Clear			Slightly turbid	Clear	Clear
Sediment				Small	0	0
Reaction		Acid	Acid	Slightly acid	Slightly acid	Slightly acid
Sp. Gr. at 60° Fr.		1.015	1.016	1.017	1.017	1.015
Chemical:						
Urea, per cent	1.20%			.60%	.40%	.90%
Albumin	Heavy trace	0	0	Trace	0	0
Sugar		0	0	0	0	0
Acetone				Present	Present	Present
Diacetic acid				0	0	0
Indican	Very heavy	0	Slight	Present	Present	Present
Blood pigment	Heavy trace			0	0	0
Diazo reaction				—	—	—
Microscopical:						
Casts						
Granular	Few			Few	0	0
Hyaline	Many				0	0
Cylindroids	Many			Few	Occasional	0
Mucus				Present	0	Few threads
Amorphous deposit				Phos'tes	0	0
Red blood cells					0	0
Leucocytes				Present	0	0
Crystals						0
Epithelial cells				Round	Few round	Few round

With the exception of patient No. 4, this patient covers a much longer period of treatment than any other. The first three analyses were made outside of our equipment and their incompleteness does not seem to reflect credit on the analyst. It has been analyses such as these that have caused us to arrange a special department in the Pittsburgh Testing Laboratory in order to have the work thoroughly done.

This patient was put on a diet which he has certainly construed liberally. He never stopped smoking, and continued to drink, but only rarely. In fact, the truth is, that within two months of commencing the treatment he felt so much better that he gave himself considerable license and returned to his vocation, working hard and continually. This case is startling when we connect with it all that the words "Bright's disease" mean. The albumin, the blood, the casts and the leucocytes have all disappeared. The man is apparently well. *It is now over four years since we took this case and the man is living and in normal health.*

URINE COMPARISONS

Patient No. 8

	At start, 7-17-12	10-2-12	1-8-13	5-5-13
PHYSICAL EXAMINATION:				
Volume, 24 hrs. c.c.	1,020	1,620	1,350	1,620
Solids, 24 hrs. grams....	62	53	38	64
Appearance...........	Cloudy	Turbid	Turbid	Slightly turbid
Sediment.............	Slight	Heavy	Slight	None
Reaction..............	Slightly acid	Neutral	Neutral	Acid
Sp. Gr. at 60° Fr.......	1.026	1.014	1.012	1.017
CHEMICAL:				
Urea, per cent.........	2.65%	1.00%	1.55%	1.05%
Albumin..............	.28%	.24%	.23%	.16%
Sugar.................	0	0	0	0
Acetone...............	Present	Present	Present	Present
Diacetic acid..........	0	0	0	0
Indican...............		None	Present	Present
Blood pigment.........	Present	None	None	None
Diazo reaction.........	Negative	Negative	Negative	Positive
MICROSCOPICAL:				
Casts.................				
Granular..........	Present		Few	Very few
Hyaline...........	Present	Many	Many	Few
Cylindroids...........		Few	Occasional	Few
Mucus................	Present	None	None	Few threads
Amorphous deposit.....	Urates	Phos'tes Urates	Urates	Phos'tes Urates
Red blood cells........		0	0	0
Leucocytes............	Numerous	Few	None	Few
Crystals..............		Urates	Many phos'tes	None
Epithelial cells.........	Round present	Many round	Many round	Few round

Here we have, in a young man, a case of three years standing and one that has had the care of several physicians. He has always been on a diet, but with no evidence of real improvement all this time. He came to us in July, 1912, through his physician and we undertook to do what we could for him. Taking the man's own repeated statements and his looks, he certainly is much improved, stronger, free from headaches, able to work hard and having a good time instead of his former rigid living and poor health.

Is he cured? No. Will we cure this case of old standing ? We do not know. As we will gain nothing by discussing it, let us discuss the analyses.

Notice that the scanty quantity of urine becomes normal; that the very high quantity of urea changes before the oxygen; that the blood pigment disappears. The albumin is stubborn but little by little it is lowered until the last analysis, when it commences to disappear with increased rapidity. At this same time radical changes are apparent in the casts—the granular casts have become very few; the hyaline ones have changed from many to few.

The real fact is that from the beginning of the treatment the changes have been many and all tending to a normal condition, and at the last increase in both force and rapidity.

This case was taken by us in 1912; the patient has moved away from Pittsburgh *but he is not dead* and we have a letter from him within the month speaking of the very satisfactory condition of his health. From 1912 to 1916 *and living.* Look at his analyses again.

OF THE SEVERAL HUNDREDS OF PATIENTS OF ALL KINDS TO WHOM WE HAVE ISSUED THE OXIDIZED OIL DURING A PERIOD OF MORE THAN FIVE YEARS, THERE HAS BEEN, TO OUR KNOWLEDGE, BUT ONE DEATH.

Bearing all these cases in mind and seeing them culminate as they do here in patient No. 8, it is not easy to deny the value of the results.

Has any one up to this time, by any known method of treatment, been able to change the destructive character of Bright's disease and enable a patient to rise step by step, strongly and surely, almost from the verge of the grave as has been done here?

This is very plain language. We would not so speak if it were not necessary, but we are advocating what we know is right and the present conditions *must be changed.* Real success cannot be attained until the laws of chemistry are admitted as governing a chemical problem—the body diseased.

On diabetes we give the results of patient No. 9, as follows:

On June 12, 1912, at start, we find	sugar .13 per cent
On August 1, 1912,	sugar .10 per cent.
On September 9, 1912,	sugar none
On January 6, 1913,	sugar none

This is worthy of notice. Our information shows the treatment stopped at about the third analysis. We had the last analysis made to see if the sugar returned when the treatment stopped.

We had a patient who had had diabetes for seven years. We took the case with 5.4 per cent. of sugar present and in a short time we put it down to 4.5 per cent. The patient felt much stronger and better but was indiscreet and the sugar went back to 5.4 per cent. We then reduced it to 2.5 per cent. and the patient seemed to think she was well; the indiscretions increased and we stopped, and the last we knew of the case, the sugar was above 6 per cent.

A third case of diabetes has come under our care. This case, all conditions considered, mainly on account of the drastic attack of the disease and the fact that we have been in a position to keep fairly good control over the case, is perhaps the most remarkable of all our human cases.

The man has had the advantage of the services of two physicians who were in accord with our views and willing to give them a thorough trial and they have relied on practically nothing but the oxidized oil in the treatment of the case.

About January 1, 1913, this man fell ill; on April 26 the treatment commenced and is still being continued at this time (October, 1914).

The data in this case have been sufficient to enable us, for the first time, to demonstrate the effect of oxidation on a human being by means of our drawing instruments and the demonstration is very remarkable.

On page 186 we place the drawing.

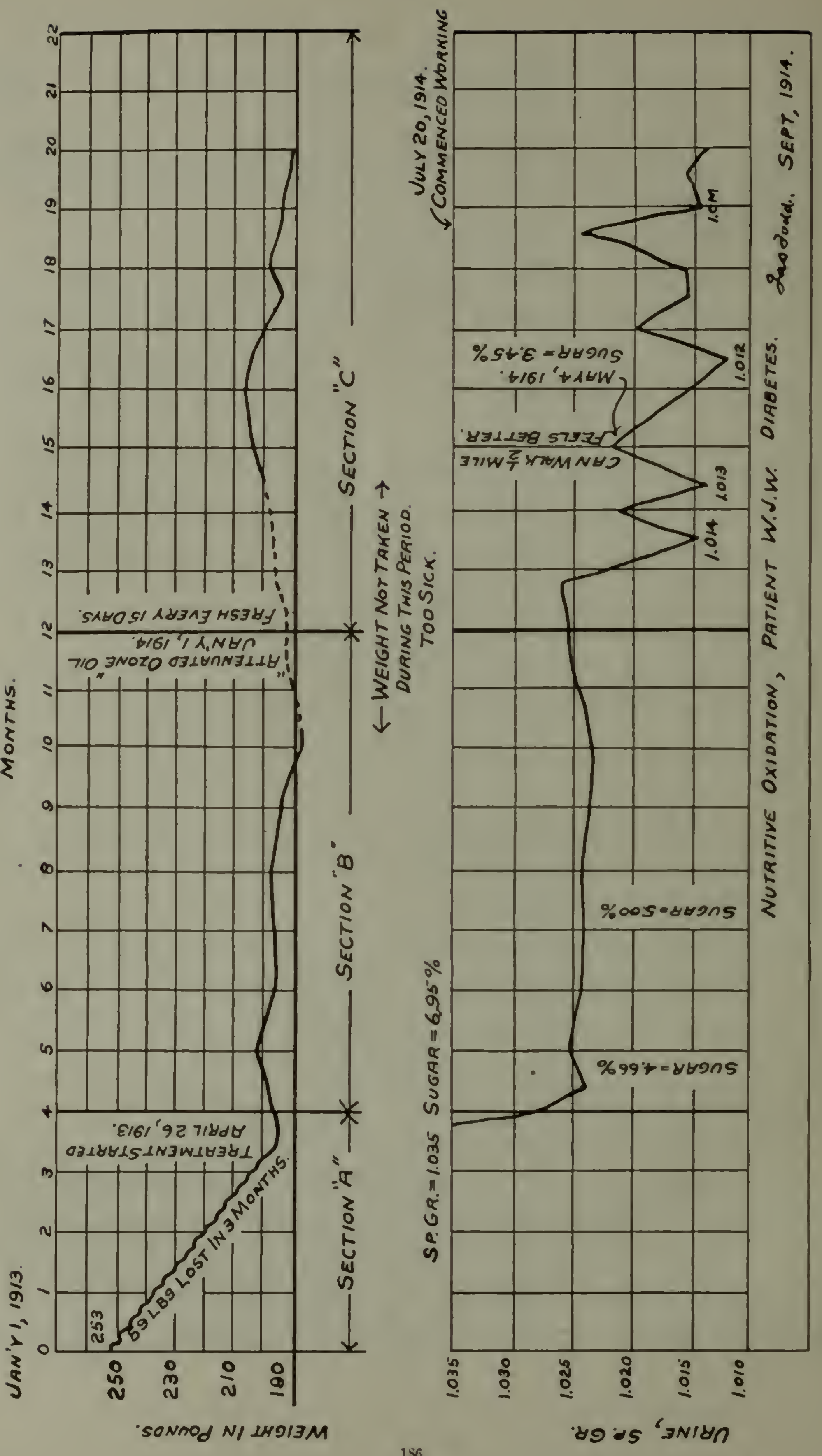
The drawing is divided into two main sections. The upper section shows the changes in weight taken at regular intervals for twenty months. The lower section consists of a curve showing the changes in gravity of the urine, we using the gravity changes because they must rise as the sugar content increases and fall as it decreases. The quantity of urine at the start averaged about two and one half gallons each twenty-four hours; this has fallen very considerably toward the end, but not nearly to the normal quantity.

The gravities used in the curve were taken from a twenty-four hour sample on the first and fifteenth of each month.

Now let us examine the weight curve with its loss of fifty-nine pounds in less than four months, and at the same time note the urine gravity line at the start of our treatment, *two and one half gallons of urine in twenty-four hours with a gravity of 1.035 and 6.95 per cent. of sugar shown by actual analysis;* is it any wonder the physicians said, as they did, that he could only live a short time so far as anything that they could do for him?

Notice the power of the oxygen at work. It is almost beyond belief, yet we know that every marking on the drawing is true. The terrific loss in weight is at once stopped, the gravity of the urine falls from 1.035 to below 1.025 in fifteen days and the sugar from 6.95 to 4.66 per cent.

This is, however, not one half the wonder of the thing, for at the time we commenced the treatment we were oxidizing our olive oil with "ozone" made by slightly compressing the air before exposing it to the electric discharge while at the twelfth month after he was taken sick, January 1, 1914, our work had progressed to the point where the problem of different forms of oxygen was swaying our


MONTHS.
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
JAN'Y 1, 1913.
WEIGHT IN POUNDS.
250
230
210
190
253
59 LBS LOST IN 3 MONTHS.
TREATMENT STARTED
APRIL 26, 1913.
"ATTENUATED OZONE OIL"
JAN'Y 1, 1914.
FRESH EVERY 15 DAYS.
SECTION "A"
SECTION "B"
SECTION "C"
← WEIGHT NOT TAKEN →
DURING THIS PERIOD.
TOO SICK.
URINE, SP. GR.
1.035
1.030
1.025
1.020
1.015
1.010
SP. GR. = 1.035 SUGAR = 6.95%
SUGAR = 4.66%
SUGAR = 5.00%
1.014
1.013
CAN WALK ½ MILE
FEELS BETTER.
MAY 4, 1914.
SUGAR = 3.45%
1.012
1.011
JULY 20, 1914.
COMMENCED WORKING
NUTRITIVE OXIDATION, PATIENT W.J.W. DIABETES.
Jas Dodd.
SEPT, 1914.

thoughts and we were then able to give this man oxidized oil made by slightly stretching the air before it was "ozonized."

With these facts before us, let us look at the curves again and look at them in this light.

Call section *A* normal oxidation, under which the man was failing and was fast going to his grave.

Call section *B* resistive oxidation and note how the disease is checked as shown by both the weight curve and the urine gravities.

Resistance, strong as it here is, will not save this man; prolongation of life is not cure and as we approach January, 1914, the weight slips down, the urine gravities rise and the man becomes so weak we cannot disturb him to obtain his weight, resistance is failing us and the end is apparently near; the writer determined to burn his bridges, to cast resistive oxygen aside and reach out for vital oxygen.

Now examine section *C*. The weight rises under the first impulse of the vital oxygen, although it falls some later but we do not worry about this because one hundred and ninety pounds is enough for the man to weigh and because the writer knows that the weight is rising at the present time (the drawing does not reach to the time of writing).

Now examine the urine gravities after January 1, 1914. See the vital form of oxygen bring the gravity down first to 1.014, then it rises to 1.022, then down to even lower than the first fall (1.013), then up again, then down, not for one period of fifteen days as before, but steadily down for three periods of fifteen days and lower than ever at 1.012, then up but not so far as formerly, then down, and for fifteen days it stays down, then up very high (1.025), then down to 1.014 and there it stays.

What a fight of the forces must have gone on within this man's chemical body during this period of full eight months when the power of vital oxygen attacked the power of the disease.

We do not intend to go further into the details of this case, except to say that on the twentieth of July this man went to work and a few days ago the writer saw him wheeling a wheelbarrow fully loaded with bricks. He said he felt well, and he looked it.

In revising our work in June, 1915, the writer finds it possible to complete this record.

The man appeared to progress well and after starting to work in July, 1914, continued his employment until the spring of 1915, when he took sick and died in a few days from an obstruction of the bowels.

This is the only death that we have had in the hundreds of cases we have treated; it is unfortunate and disappointing as it makes room for endless argument, but criticism and argument cannot destroy the wonderful record of the struggle between the opposing forces of the disease and the oxygen as truthfully depicted upon the drawing.

Of other patients there are many and of various classes, all showing improvement. Nervous breakdowns; chronic headaches; deranged hearts have become normal; generally low physical conditions have entirely recovered. One case of throat trouble, where the voice had been practically lost for months, speedily recovered. We have seen carbuncles stopped in their formation. One of our physicians writes, "It is the best tonic I have ever known"; another says that the symptoms, in any case, are always reduced when the treatment is administered.

The oxidized oil has been particularly valuable in the case of children, ranging in age from eight to twelve years, when they have become run down and nervous, possibly from growing too fast. When placed on ten-drop doses after each meal, they recover with great rapidity.

It is not our purpose to argue about the results; let them stand for themselves. It should be remembered, however, that these results were predicted on the condition that practical oxidation could be attained.

Have we had failures? Yes, in that we seemed to accomplish little; but we never have done harm, and we know of no case where the oxygen was properly and persistently taken that there were not decided benefits. The only trouble with this branch of the work is that the oil is hard to digest, consequently we are limited to a maximum dose of but twenty drops.

The field should be explored to secure other materials that will carry active oxygen without being so indigestible. Although this is a perfectly feasible course, we have not the facilities for carrying it out. We have oxidized other oils but have had no opportunity to use them.

The keeping of records; the citing of particular cases is of great value but beyond and above all this is the record that time makes, for it is the final test. For four years we have been making and giving this oxidized oil to those who asked for it—not others for we have sought none—and the very fact, for it is a fact, that we are supplying more today than ever before is the test of time. If the oxidized oil had not possessed great inherent value of its own, it could not have progressed unless advertising and energy had been put back of it; these have never been employed and we have never taken a penny for it.

There is a warning we wish to give for those who may investigate our process, viz.: that the early stages of the investigation of such questions as are here raised, should not contemplate an attempt to make records by treating the worst class of cases. It should ever be borne in mind that we know little as yet of oxidation, either in application or result, and the "miracles" should be left for a later day.

At this point the reader has before him all of the results of our experiments, both upon animals and human beings and we would ask him to turn back and see that from one end to the other of these experiments there is but one story told and that a simple fact.

Oxidation has been accomplished and the results have been beneficial.

Furthermore we would have him realize the truth, so apparent in the accumulated facts of these experiments. *It is this—we do not give the world a new cure—we give it far more, new principles upon which to base the rational treatment of disease.* This wonderful power of oxidation that nature has placed within our reach *must not be lost.*

NOTE.—Perhaps the statement that my work is revolutionary and would require the physician to admit that all his vast accumulation of knowledge must now be thrown aside has been made, in criticism of these experiments, more frequently than any other single comment. I think it necessary to plainly state that this is neither my opinion nor the opinion of any of those who thoroughly understand the work. Plainly stated, the fact seems to be that we have worked a step further back in the chemistry of life than those who have preceded us. The physician deals with his serums, his antibodies and his phagocytes while we deal with the elements of which they are composed. Given the proper proportion and action of the elements of which the body is composed and the serums, the antibodies and the phagocytes must come as a natural result and in greater force. The revitalized body must respond in this respect as the depressed or depleted body cannot and this is one of the great points that our experiments prove.—J. T.

REVIEW

It is our intention to bring together in this chapter certain features of our work for the purpose of concentrating the reader's attention upon the very strong proofs of the power of oxygen which the work holds.

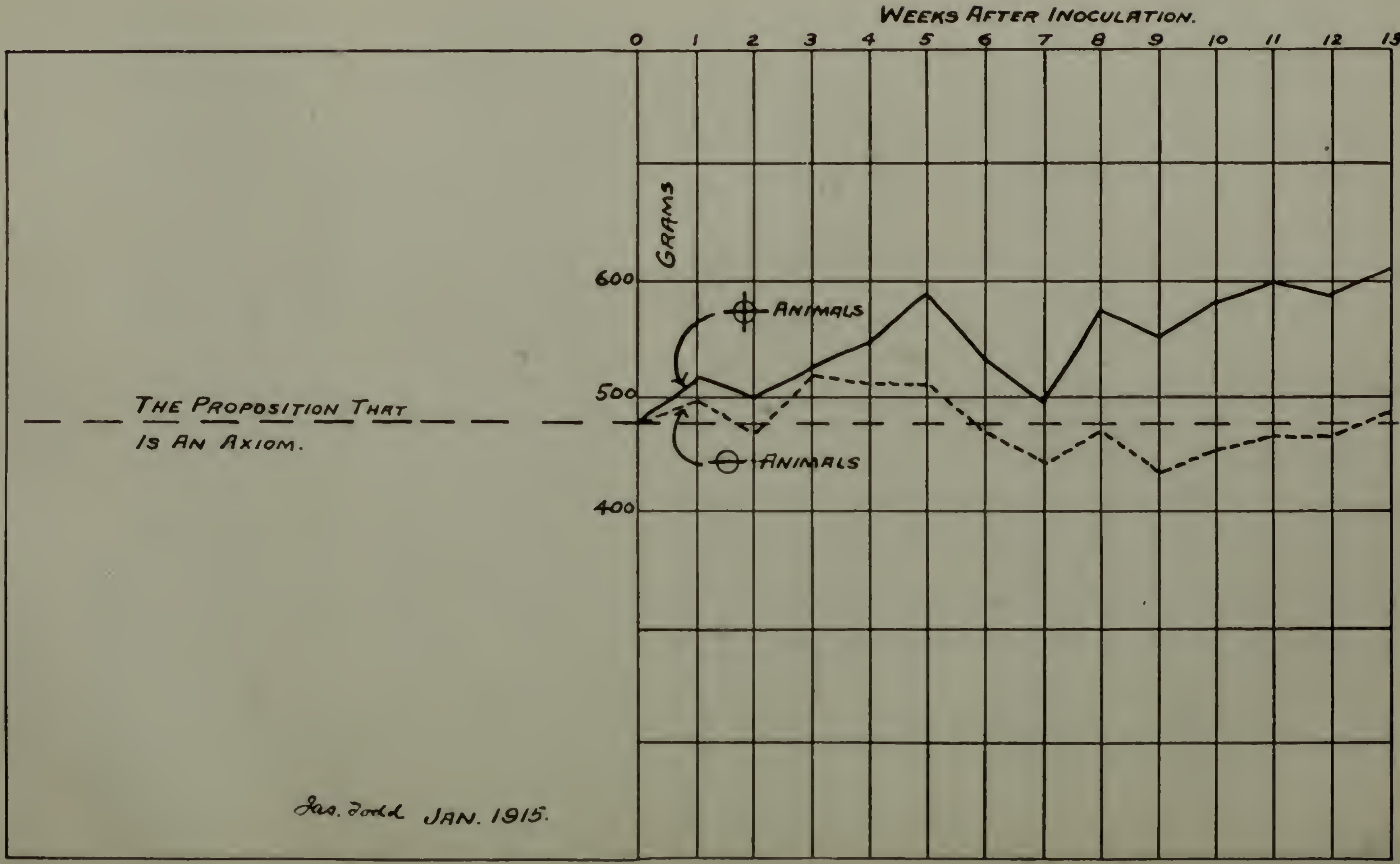
We shall commence with an axiom.

If a number of guinea pigs, which are as nearly identical as possible, are divided into two groups and each group kept under the same conditions and fed the same, but the one group, marked ⊕ as a matter of identification, are kept for say three months continuously under the influence of intensified oxygen, while the other group, marked ⊖ as a matter of identification, are kept away from the influence of the intensified oxygen:

Then if our claim that intensified oxygen can raise the vital forces of the living body is correct, the oxidized, ⊕, animals must show some proof of the truth of this theory when they in common with the natural, ⊖, animals, are brought to the ordeal of an identical inoculation. There can be no doubt that a thorough investigation of our work would finally center upon such a proposition as conclusive of the matter.

We place on page 192 the drawing The Proposition That is an Axiom.

Here we have carried out all the conditions of our proposition allowing absolutely no difference between the two groups of animals excepting that the ones represented by the solid line were oxidized before their inoculation while the ones represented by the dotted line were natural animals.


WEEKS AFTER INOCULATION.
0
1
2
3
4
5
6
7
8
9
10
11
12
13
GRAMS
600
500
400
⊕ ANIMALS
⊖ ANIMALS
THE PROPOSITION THAT
IS AN AXIOM.
Jas. Todd JAN. 1915.

As we see the two lines separate until at the end of thirteen weeks the oxidized animals weigh one hundred and twenty-five grams more than the natural ones we find that our proof is conclusive and our proposition sustained.

When we further note that the oxidized animals have increased in weight from four hundred and eighty grams to six hundred and ten grams, *an increase of more than twenty-five per cent. in weight*, while the natural ones have barely held their original weights, we determine that the evidence is indisputable and the proposition that is an axiom stands too strongly to need argument.

These lines are of four ⊕ animals and seven ⊖ ones. They are taken from section *A*, CHART NO. 2 of the Nitrogen Experiment, page 130. This is not a chance test of the work but is sustained by the experiments from one end to the other.

Turning to page 21 we find EXPERIMENT 1–14–10—The Animals Under Treatment and the same evidence is shown in the difference between the weight curves of the oxidized and the natural animals.

Passing on to the August Experiment we find no drawing upon this plan but the whole experiment is full of the fact and the power of oxidation.

Passing by the November Experiment, as no preliminary oxidation was accomplished in this experiment, we come to the First May Experiment. We will not ask you to follow the question through all the drawings in this experiment, but rather to turn to page 108, where will be found CHART NO. 3—Conclusions. This drawing is based on the First May Experiment and brings out the whole question.

In the Nitrogen Experiment—CHART NO. 2, page 130, sections *A*, *B* and *C* deliver the same proofs.

Experiment 3–12–14 does not show this distinction between the two classes of animals as the machinery operations and treatments were too rapidly changed in this experiment to allow the proofs to come out.

There is no necessity of dwelling further upon this consistent proof of success. If this drawing cannot awaken interest, nothing that we can say could do so. We have laid down our axiom and are content with the result; all we ask is that the question be closely and intelligently examined.

In further review we would ask you to turn to the drawing Experiment 5-4-11—RESISTANCE TO TUBERCULOSIS ESTABLISHED—CHART NO. 22, page 102, and again examine the comparative length of the life lines and so again face the question of resistance established and what it means.

Turning now from our experiments with animals to those with human beings, we place in regular order the results of the Nutritive Oxidation treatment upon albumin in the urine of five cases of Bright's disease and ask a close examination of the evidence.

In order to bring the matter out tersely we only use the albumin determinations; the other features indicative of the disease improved as did the albumin.

ALBUMIN DETERMINATIONS

	Analyses Made Before Treatment Began	Analyses Made After Treatment				
		1st	2d	3d	4th	5th
Albumin..	Strong trace	Trace	Trace	None	None	
Albumin..	Trace	None	None			
Albumin..	Trace	Trace	None	None		
Albumin..	Heavy trace	None	None	Trace	None	None
Albumin..	.28%	.24%	.23%	.16%		

Leaving tuberculosis and Bright's disease, we turn to page 186 and again read the record and examine the drawing used in the case of diabetes there dealt with.

We here rest our case based on the facts accumulated by six years of work.

THE THEORY IS WELDED INTO A FACT. THE CHEMICAL STANDARD OF THE LIVING BODY IS RAISED. THE SUSTENANCE OF DISEASE REMOVED.

The responsibility now passes from us to rest upon the final judgment of that which we call the WORLD.

THE FINAL TEST

This book was originally written to be published as an effort to obtain the resources necessary to carry on a comprehensive line of experiments looking to the solution of the problems we have placed before you.

Just before its publication we decided to completely change our plan and to publish it first for private circulation, utilizing it solely for the purpose of obtaining a large number of cases of disease in human beings that we might add their records to our work at the time of final publication.

The change in our original plan has been brought about by the careful consideration of many questions, two of which are necessary to the reader's understanding of the situation.

The work which we have been doing with the oxidized oils has been gradually assuming an importance that we hardly hoped to attain at this stage.

Besides perfecting the making of these oils, we have been able to add to the original oxidized olive oil an entirely new development in the oxidized cod liver oil and have been able to raise the quantity of available oxygen in both to almost double the amount we originally attained, and by a careful study of the questions involved in their oxidation have materially increased their digestibility.

The coincident effect of the increase in the quantity of available oxygen in the oils added to the larger quantity we can use at a dose has gone far towards convincing us that we can establish ourselves so strongly, at least in demonstrating resistance to certain diseases, as to make the value of our process unquestionable.

There are many important questions raised by these experiments but standing out above all the rest there is one that must be faced, one which we may not flinch from and one which our reader has the right to expect us to prove by every reasonable means at our disposal.

When we stated that we would by proper oxidation so raise the vital forces of the living body as to cause that body to react to its material advantage upon the disease or condition attacking it, we did not limit ourselves to any one disease.

We did not say we had a cure-all, but we did say the application was broad.

This proposition is diametrically opposed to the modern idea of medicine. We have stated it and we have proved it to our own satisfaction and our conception of our duty requires us to assert it.

We are fully aware that we choose between two paths; the one easy, the other hard and filled with contention. If we were to ask the world to come and see us cure tuberculosis with ozone, they would come, but some of them would have Bright's disease and die because we were afraid to speak that which we knew to be the truth.

We must not lose the broad application of the treatment and we must not conceal the evidence as to the changeability of the element.

It is of the greatest importance that all evidence that can be brought to bear upon these questions should be systematically collected in one center and to this end this Committee intends to lay down reasonable rules for the issuance of these remedies.

We will only issue them under the care of a physician and we shall exchange them, not for money, but for carefully kept records which in the end shall all be published. We will take a general run of cases of different diseases, but shall particularly center upon early cases of tuberculosis and Bright's disease. We will not take cases that are so far gone as to lead to probable disaster, as we conceive it to be our duty to save our process rather than the individual.

If you aid us, as you now can do, it is not unlikely that you will take part in the successful development of the oxidation of the living body and thereby make possible a new method of fighting disease.

As we have not argued about our drawings, we will not argue about human nature, but simply leave it to your individual decision.

At your request we will supply you with our rules and do everything we can to aid you.

NOTE.—Circumstances seem to make it obligatory upon us at this time to base our future operations upon the use of the oxidized oils on human beings.

While taking this course in full confidence we yet regret the necessity of even temporarily abandoning the problem of the different forms of oxygen, for in this direction must eventually lie the future of these very important questions.

THE CHEMICAL AND MECHANICAL SECTION

PREFACE

Add to the work we have done on tuberculosis the further task of paying attention to one's daily occupation and it becomes apparent that we have had far too little time to give to the study of so-called "ozone." Long intervals have passed in which we could do nothing, so that we reach this portion of our work inadequately prepared to meet the situation.

To our mind this problem of ozone is one of the greatest mysteries of modern chemistry and unfortunately the work that we have been able to do is mainly destructive, for the problem is such that it is necessary first to remove the errors with which it is burdened before we can hope to solve it intelligently. However, there is no reason, with the errors removed, why the problem should not give way to intelligent work.

This section is mainly for the purpose of supplying the necessary data to enable others to reproduce our work and should not be construed as an attempt to force our views upon others.

THE OZONE THEORY

The writer has designed an apparatus and operated it many times, both with air and with pure oxygen, which enables us to make gas analyses in such a way as to eliminate all calculations such as barometric pressure, temperature and humidity By means of this apparatus we both made and destroyed so-called ozone within sealed vessels but we were never, at any time, able to obtain any contraction during its formation, or expansion during its destruction.

Our sole reason for not attacking the theory of ozone formation is that we do not feel that our work calls for its removal. If oxygen is capable of taking many different intensified forms, one of them may be in accord with the ozone theory and we not have made that particular form when investigating the matter. If oxygen can and does take different intensified forms, there can be no so-called ozone theory such as is now accepted for the very fact that there is more than one form destroys the ozone theory because that theory claims to account for the whole phenomenon by means of one form of the element.

We believe that the only reasonable explanation of our experiments is that oxygen *can* and *does* take many different forms or activities and either our view or the ozone theory must give way because they are incompatible with each other in so far as the ozone theory is based upon O_3 being the only intensified form of the element.

THE DIFFERENCE BETWEEN SO-CALLED OZONE AND OXIDES OF NITROGEN

The first obstacle that was met when we determined to undertake this work was that there was no known way of distinguishing between oxides of nitrogen and so-called ozone, all prior efforts to differentiate between the two sets of gases having failed.

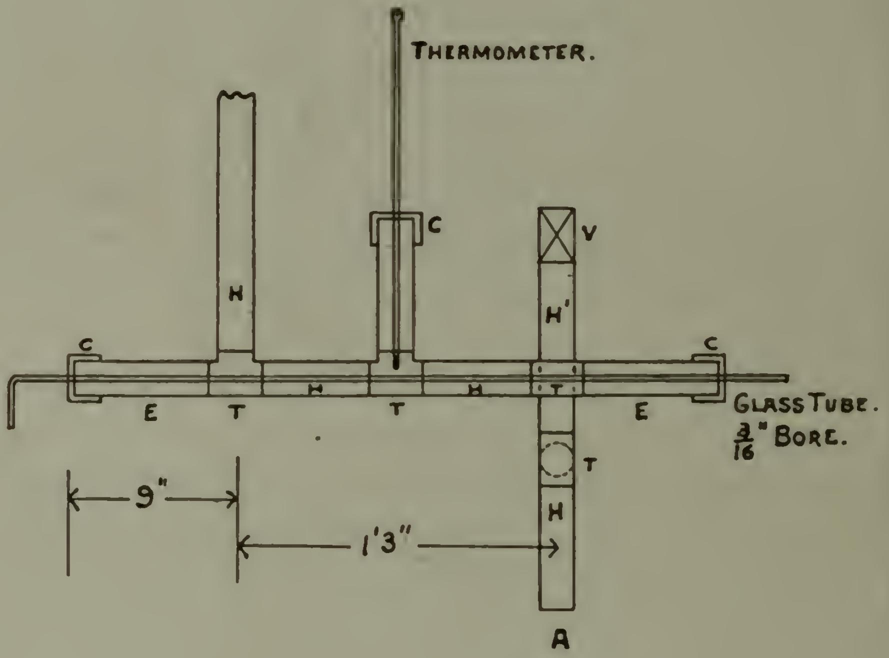
To give the animals peroxide of nitrogen fumes, which would quickly result from the presence of the oxides of nitrogen as they would build upwards from the lowest oxide form to NO_2, might prove fatal and so must either be evaded or clearly known and planned for.

With this condition before us it became of paramount importance to be able to determine the difference between the two classes of gases in order to know which one was being made by our generators. Eventually we found the distinction in the fact that so-called ozone is instantly destroyed when heated to 310° Centigrade while the oxides of nitrogen will stand much higher temperature, 400° Centigrade having no effect on even traces of the oxides of nitrogen.

On page 202 is a drawing of the apparatus we use for continuous testing for the presence of oxides of nitrogen.

The apparatus is made of two-inch pipe and fittings as shown in the drawing and all that portion through which the heat passes (marked *H*), as well as the branch for the thermometer, must be covered at least two inches thick with asbestos pipe covering to prevent heat radiation.

The apparatus consists of the necessary two-inch pipe, four tees, marked *T*, three caps, marked *C*, and one two-inch valve, marked *V*.



APPARATUS
FOR DISTINGUISHING
SO CALLED OZONE FROM
OXIDES OF NITROGEN.
Jas. Todd. SEPT. 1911.

A lighted bunsen burner is placed at *A*, the heat from which passes through the path marked *H* and is registered on the thermometer. Should the heat rise too much, either turn the burner down or open the valve which is connected with a pipe near the top of the flame and which will conduct the heat through a different path (*H′*) from that occupied by the glass tube.

Immerse the bent end of the glass tube in a small bottle containing iodide of potassium and starch solution. The gas passing slowly through the glass tube is heated to the temperature shown by the thermometer (400° C.), all so-called ozone is destroyed at 310° C.; if no nitric oxides or acid are present no color is imparted to the testing solution, while if they are present the color is in direct proportion to the quantity.

Of late we have been using, instead of this apparatus, a capillary platinum tube, coiled and heated red hot, as we have found that the oxides of nitrogen, even in minute traces, are stable even at a red heat.

This test is wonderfully delicate, we being able to clearly detect peroxide of nitrogen when present only to the extent of one part in one hundred thousand.

THE EFFECT OF MAGNETISM ON OZONIZED AIR

Under this title we place a drawing on page 205.

The following description records one of the real mysteries of this work—the experiments that we cannot now repeat.

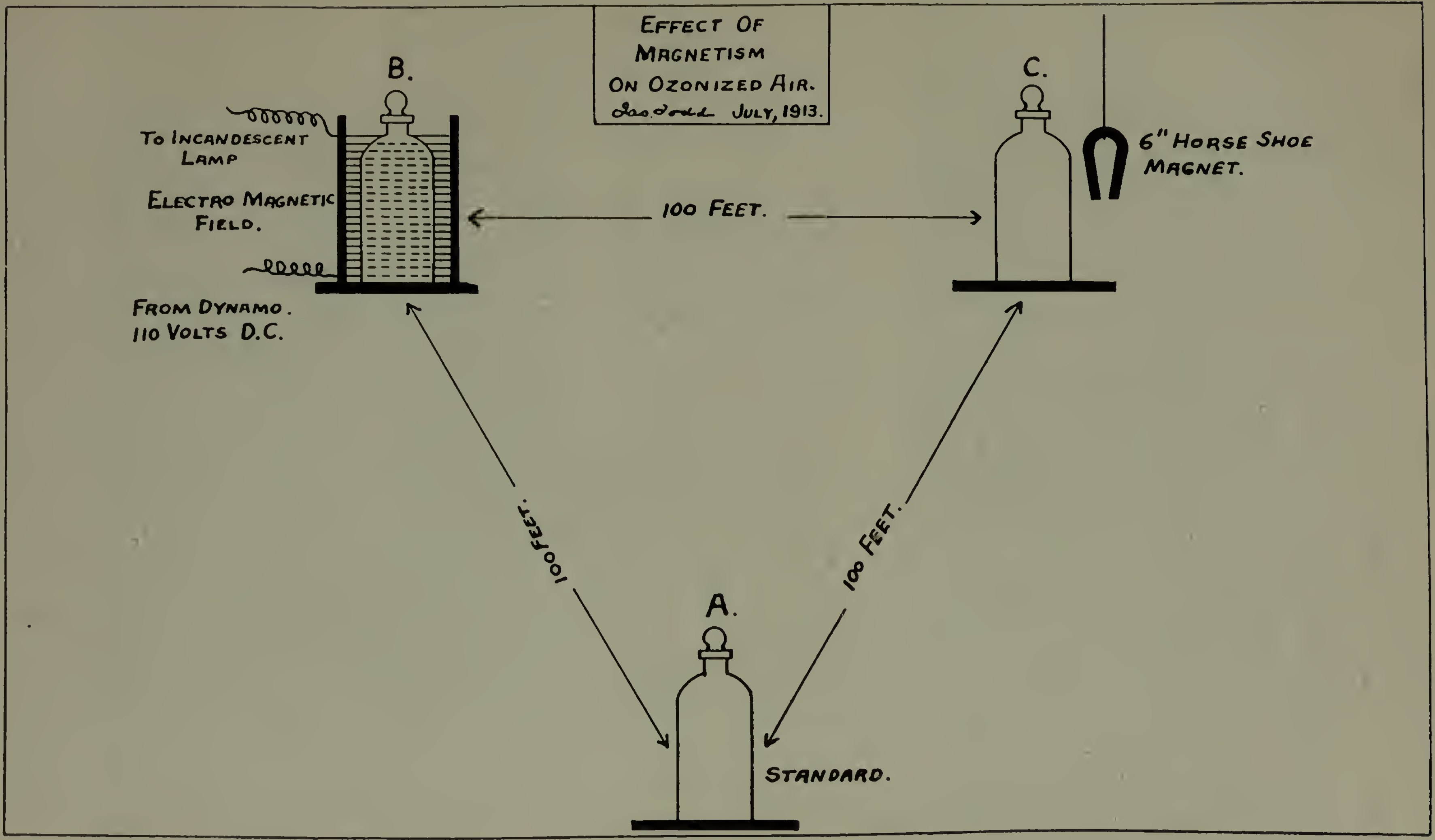
Three bottles marked *A*, *B*, *C*, capacity about 2,500 c.c., are attached by glass pipe lines to the pipes containing the ozonized air. The ozonized air is passed first through cotton to cleanse it thoroughly, then through three successive washings in concentrated C P. sulphuric acid to dry it, then through the bottles which are placed in tandem. By means of the proper arrangement of the glass tubes the gas passes through a tube to the bottom of the bottle, then leaves the bottle through a tube near the top.

The gas is allowed to rush through these bottles for one half hour so that there shall be no question of their containing anything but identically the same quality of the ozonized air. They are now taken away and glass stoppers inserted.

These bottles are then placed in three different positions as shown by the drawing. At the end of three hours they are opened and a measured quantity of iodide of potash and starch solution poured into each.

The standard, bottle *A*, and the one placed in the electro-magnetic field, bottle *B*, both show the presence of the ozonized air unchanged by turning the testing solution as deep a blue as the same quantity of the fresh gas would do.

Bottle *C*, which has had an ordinary six-inch horseshoe magnet hung close to, but not touching it, fails to change the testing solution, thus proving that no so-called ozone remains in it.



EFFECT OF
MAGNETISM
ON OZONIZED AIR.
Jas Dodd JULY, 1913.

A number of further experiments seemed to indicate that the position of the magnet with regard to the axis of the earth had a distinct influence upon the reaction. When the bottle was placed south of the magnet the reaction seemed to be more rapid.

We constructed a large iron magnet operated by a dynamo and capable of lifting three hundred pounds. It destroyed the gas but not more rapidly than the small one.

These experiments were made a great number of times by Dr. Riddle and the writer during the first nine months of 1910. To say that they were repeated fifty times without failure during this period would not be an exaggeration. Other persons were invited to see and saw them.

After October, 1910, we lost this characteristic of the gas and all efforts to repeat the experiment have since failed.

We will not stop to marvel at the fact that magnetism has here possibly shown its power to cause chemical activity or to speculate upon the wonders of such a revelation. If magnetism does it in one case it probably will be found to do it in others, but this is not the field we are now investigating.

The significance of the matter to us (we would not publish an incomplete piece of work such as this for a lesser reason) is that the period in which these experiments were made was the period of the January and the August Experiments, when tubercular healing and cures were present as they have never been since; where weight changes were clear and decisive.

It may be that the solution of our problem will come when we are able to reliably make and use a form of so-called ozone that is decomposed by the proximity of an iron magnet.

While we speak of the magnet as causing this phenomenon, yet in view of what we know regarding the effect of iron upon so-called ozone, it is worth bearing in mind that the wire in the electro-magnet is copper and that it is within the range of possibility that the reactions were caused by the proximity of iron to the gas.

NOTE.—Since writing the above Doctor Charles P. Steinmetz has offered as a possible explanation of the phenomenon the possibility of the "ozone" having been destroyed by the presence in the bottles of very finely divided iron, coming from the iron revolvers of the blowers, incapable, on account of the small quantity and extreme minuteness of the particles, of destroying the gas until gathered into one place by the attractive power of the horseshoe magnet. The electro-magnetic field would not draw the particles of iron to one place as it encompassed the whole bottle. We have decided to publish both the phenomenon and Doctor Steinmetz's very interesting explanation.

THE EXPERIMENTS WITH THE GLASS TUBES

Under this title we place a drawing on page 209.

Our object in publishing these experiments is to place such data here as will plainly show that so-called ozone is not the simple problem it has been considered to be; to show characteristics that will prove it to be very far reaching in its character and consequent ramifications. Upon the upper section of the drawing we show a glass tube four feet long by three fourths of an inch internal diameter. Scattered upon the floor of this tube is a small quantity of chemically pure sesquioxide of iron—the highest ordinary oxide of this metal.

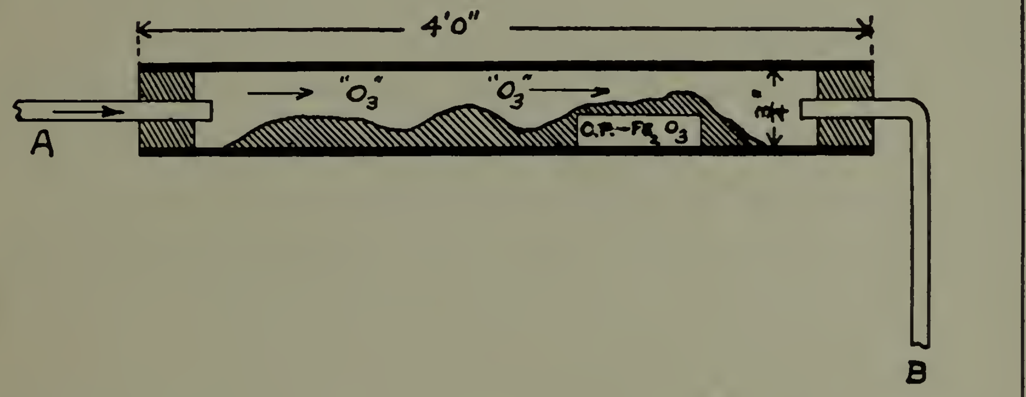
The so-called ozonized air enters the tube at *A* and passes over the iron oxide to the exit *B*. At *B* a bottle filled with iodide of potash and starch solution is so placed as to allow the gas to bubble through it. The gas passing slowly through this tube fails to turn the solution blue, thus showing that the so-called ozone has been destroyed.

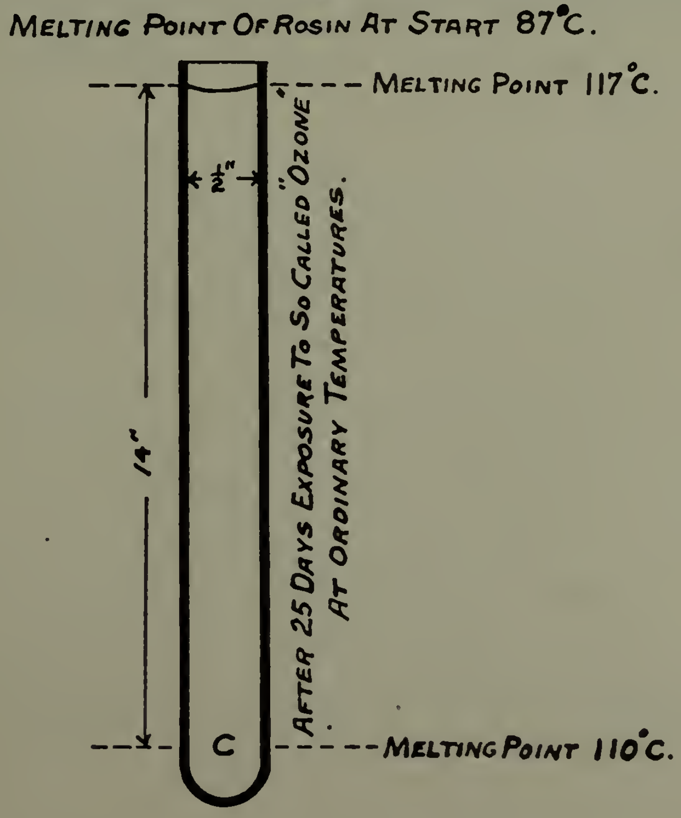
It may be objected that the iron oxide is not pure, or not all of the higher oxide, or has been oxidized to a still higher oxide by the acknowledged high oxidizing power of ozone. All these criticisms are very reasonable at this stage and to meet them *we allowed the gas to pass through this tube, day and night, for fifteen months and at the end of that time the gas was destroyed exactly as it had been at the start.* The continuous action here shown cannot be due to a simple oxidation else all the ferric oxide would have long since been oxidized and so the reaction brought to an end.

On the lower section of the drawing we place another glass tube open at but one end, the other being sealed. This tube has been filled with ordinary rosin, carefully melted and annealed so as to

THE EXPERIMENTS WITH THE GLASS TUBES.

Jas Dodd JANUARY 1913.




MELTING POINT OF ROSIN AT START 87°C.
MELTING POINT 117°C.
1/2"
14"
AFTER 25 DAYS EXPOSURE TO SO CALLED "OZONE" AT ORDINARY TEMPERATURES.
C
MELTING POINT 110°C.

give a stick of rosin without any cracks or flaws fifteen inches long and one half inch in diameter, surrounded by glass walls except at one end which is open to allow the gas to come in contact with it. So-called ozone has the power of raising the melting point of rosin by simple contact with it. At the start the rosin used had a drip melting point of 87° Centigrade.

The tube was placed, at ordinary temperatures, in a room constantly filled with the gas for a period of twenty-five days. At the end of this time the melting point had been raised at its surface, at the open end of the tube to 117° C. The lower end of the glass tube was then cut off one inch from the bottom, a sample of the rosin taken and found to have a melting point of 110° C.

The gas had penetrated to the very bottom of the tube and performed its work almost as well as at the top.

"O_3—an allotropic form of oxygen." This is certainly no ordinary modified form of oxygen. It is a problem and it must be carved out of the flint of human ignorance of the things with which we are surrounded.

WHAT IS SO-CALLED OZONE?

Here is the very pith of our problems. Here is where we must first center if we are to reap complete success, and here we are the least prepared for our work.

Undoubtedly the animal work should, if necessary, be set aside and all energy bent unceasingly upon this strange mystery until by means of its solution we are enabled to think intelligently about it, so that our deductions may be reasonable and consequently our results foreshadowed.

Dr. Riddle advances the idea that ozone may be simply an excitation of the elements caused by passing the atmosphere through the "silent" electric discharge: a greater activity being imparted to them, but not necessarily resulting in any definite combination between them.

Ozone may be the division of what we consider an element, it may also be a definite combination of oxygen and nitrogen into the form of an oxide of nitrogen as yet unknown to us, as for instance N_2O_{10}, its oxidizing power depending upon the overload of oxygen it carries.

In dealing with this problem we are unable to find records of the work of others that show clear proof of the absolute accuracy necessary and so we believe that it is imperative for us to start at the very beginning and to prove which element or elements enter into the problem. We think the best way to attain this is to make oxygen by the electrolysis of distilled water, collecting the gas by using a one per cent. solution of iodide of potash and starch as a menstruum instead of water and acting upon the collected gas with a high tension spark, utilizing the necessarily remaining small portion of the iodide solution as an indicator for the gas.

In addition to the above course with oxygen we would suggest the preparation of large quantities of the atmosphere from which the oxygen has been completely removed, by means of pyrogallic acid and soda solution, for like tests, as also the preparation of perfectly pure nitrogen.

Having by such means absolutely proved which element or elements are necessary to the formation of the gas, a right start can be made and the direction of the investigation followed with much greater confidence than at present.

To undertake to deal with this problem arbitrarily or by means of assumed statements in regard to it would lead to no good, hence such a course has not been pursued. Neither will we attempt to prove even what little we may, but rather rely upon the one thing that holds out hope of reasonable deductions—the fact that the skilled experimenter frequently acquires reliable information simply from the skill and insight that comes from long and constant scrutiny of his subject. Ours has been for a period of more than six years.

Without attempting to speak authoritatively, without attempting to make the matter concrete by placing suppositious formulas before the reader, we merely state what in our judgment is the trend of the matter.

In our judgment so-called ozone consists of not one form of matter but of many, how many we will not attempt to say. Of these different gases we believe that their most definite characteristic is difference in oxidizing power. Some forms are so weak in oxidizing power as to be useless for our purpose. Others are sufficiently active to create a strong resistance to tuberculosis. A third form seems to be so intensely active as to oxidize the living animal so strongly as to enable it to throw off disease easily.

The clear evidence of this latter form and its successful results are shown in the January and the August Experiments, while the gas used in the First May Experiment seems to have belonged to the second class, and yet, on the very verge of what it should be as evidenced by the extreme resistance to the disease and the fact that tubercular healing was present in some of the animals.

So-called ozone of the class that we require may be such an intense oxidizing agent as to cause it to oxidize the nitrogen accompanying it through the pipes, possibly not necessarily in the generating cells, but after passing them.

We have, for instance, pretty clearly established the fact that some forms of so-called ozone transport through pipes without loss of strength while others lose as much as twenty-five per cent. of their strength in passing from the engine room to the animals. We are inclined to think that especial significance attaches to those forms that decompose most readily as in our judgment they will be the most active.

In the chapter on the effects of magnetism, we have dealt with another characteristic tending to the same conclusions, for probably the gas that was destroyed by the magnet was not the same as the one which was not.

The continual discussion which this whole ozone question has raised is quite possibly due to this same condition as some claim to have obtained wonderful results while others cannot sustain their work. If we assume that the problem is as we have stated, this state of affairs is fully accounted for, for unknowingly one person gets a suitable gas while another makes something entirely different.

If the case is as we think, the proper steps can be taken to prove it and make the future practical because it should not be very difficult, with the whole field of chemistry from which to draw, to obtain reagents that would be differently oxidized by the various forms of the gas and so enable us to place ourselves on a stable foundation.

The writer is inclined to think that it may possibly be necessary to draw air for our purpose from a large natural source of absolutely uniform supply, as for instance from the Mammoth Caverns of Kentucky where the air is of a fixed temperature, humidity, etc., and where even the effect of light has been removed for long periods.

In such a way an absolutely fixed condition of the atmosphere would be obtained which, even if not normal, would establish a reliable working basis.

A coal mine should not be used for such a purpose, as the organic matter present might affect the result. Probably an ordinary preparation of the air as regards temperatures and humidities will be sufficient, but the above should be kept in mind.

THE GAS DISTRIBUTOR

This apparatus is exceedingly simple both in design and operation; its object being to measure, mix and deliver the air and "ozone" at the strength and volume determined by the operator.

On page 216 we place a detailed drawing of the instrument.

The rear portion of the case (2) is a measuring device in the form of a cast-iron cylinder six inches long and exactly one and seven eighths inches inside diameter, opening into a larger cylinder (4) three and one half inches in diameter, this latter portion of the apparatus acting as a mixing chamber for the gases.

The smaller or inlet end of this casting is threaded for two and one half inch pipe and is screwed into a two and one half inch valve, the outlet end is threaded to fit a four-inch pipe which, however, is not attached in ordinary use.

Fitted through the side of the mixing chamber is a three quarter inch brass pipe (5) carrying the "ozone"; attached to this pipe by means of an elbow is a piece of brass pipe (6) in which ten holes are drilled and reamed to exactly three sixteenths of an inch in diameter. A brass ferrule (7) is threaded as a sleeve over the perforated pipe; as this ferrule is moved it either opens or closes the holes and as three sixteenths of an inch is in area equal to one one-hundredth of the area of a circle of one and seven eighths inches, under uniform conditions, just one per cent. of "ozone" will mix with the air for each hole opened, but the conditions are not uniform as the shape and the length of the openings differ and it has been necessary to find the proper pressures on each gas. This has been accomplished by means of gas meters and we have established as a working rule

FIG. 1.

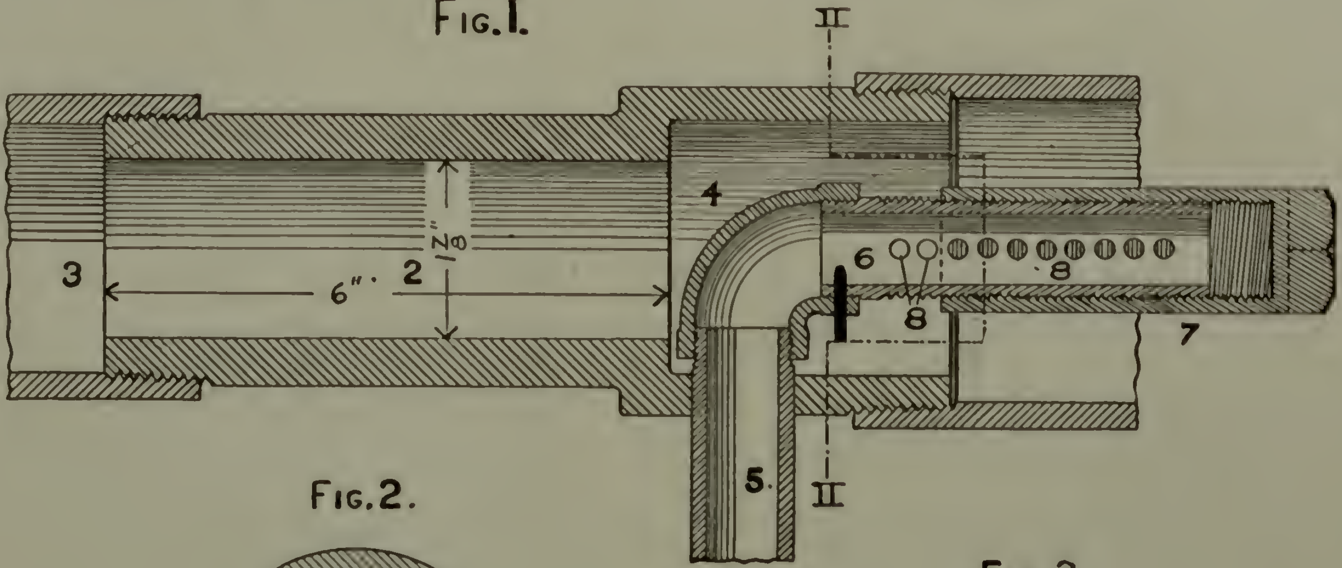


FIG. 2.

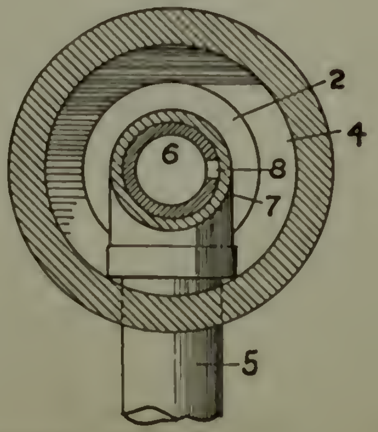
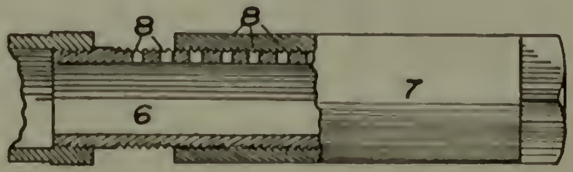


FIG. 3.



GAS DISTRIBUTOR.

DESIGNED BY Jas. Todd. FEB. 16, 1910.

four inches of water pressure for the air and three inches for the "ozone," these figures not being exact but close enough to be practical.

By placing a piece of pipe and a four-inch valve on the outer end of the distributor casting and tapping a small pipe into the side of the pipe, the distributor can be used for the surface treatment of wounds, or any form of local application. Slightly closing the four-inch valve will cause sufficient pressure to force a portion of the mixed air and gas out through the small side pipe.

For this latter purpose the whole apparatus should be coated with tin and the four-inch valve should only be closed enough to cause a satisfactory flow through the side pipe, as it is apparent that if it is closed to a considerable extent it will retard the proper mixing of the gases.

The distributor must be constructed exactly as shown in the drawing and must be kept clean and free from dust.

THE TESTING OF SO-CALLED OZONE

We are seriously hampered by the lack of a good quantitative method for testing this gas, but we have succeeded in evolving a method which gives satisfactory comparative results. The essential of the method is identical operations upon an assumed standard of strength.

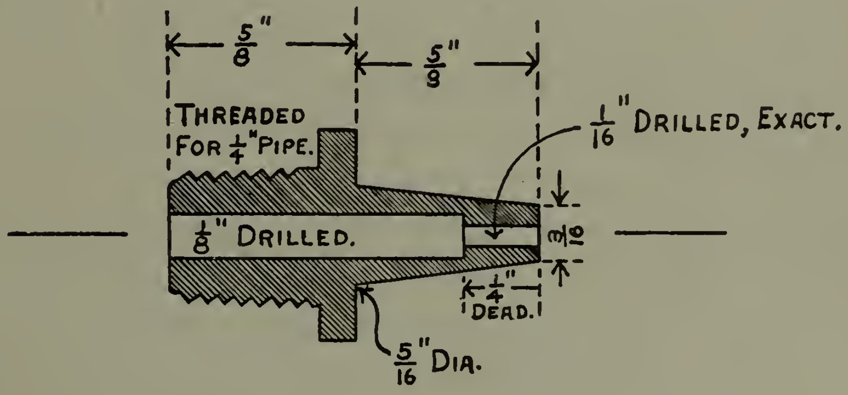
We have learned to consider a certain strength of the gas as normal, and in order to inform the reader in regard to that standard we give, in rotation, the essentials, using as an indicator the blue color formed in a solution of iodide of potash and starch by the action of the gas bubbling through the solution for fifteen seconds.

The intensity of the color to be obtained can be determined by dissolving 0.1 grams of iodine in 50 c.c. grain alcohol and then diluting with water to exactly 1000 c.c. To 25 c.c. of a one per cent. solution of potassium iodide in water, to which 3 c.c. of starch solution have been added, add 5 c.c. of the iodine solution; the color obtained will be the same that we use as normal in our testing.

On page 219 we place a drawing of the testing nipple. The essential dimensions of this design must not be changed, for if the form or dimensions are changed the quantity of gas passing through it at a given pressure will be changed. It should be made of brass and cleaned before use by passing a one sixteenth drill through the opening, being careful, however, not to enlarge the opening.

Through this nipple at the same pressure, the same quantity of gas will pass at all times. Its use is to measure the gas tested.

The testing solution is a one per cent. solution of potassium iodide in distilled water and may be made in quantity and kept indefinitely.



GAS TESTING NIPPLE.

DESIGNED BY Jas. Todd. APR. 8, 1910.

The starch solution, which must not be kept for use longer than two days, is made as follows:

Four grams of starch are rubbed to a smooth paste in a mortar with 10 c.c. of water. 100 c.c. of distilled water is heated to the boiling point and the paste slowly poured into it and the whole allowed to boil for one minute after the starch paste is added.

We use for testing purposes salt mouth bottles holding 50 c.c. and pass the gas into them by means of a short rubber tube connecting the gas testing nipple with a piece of glass tubing of about $\frac{1}{8}$-inch or $\frac{3}{16}$-inch bore, the glass tubing passing to about one inch below the surface of the testing liquid.

To make the test place 30 c.c. of the potassium iodide solution in a bottle, add 3 c.c. of starch solution, adjust the pressure on the gas pipes to exactly three inches of water pressure at the place the gas is being taken from, accomplishing this either by opening or closing the release valve on the gas line.

After seeing that the testing nipple is clean, attach the rubber tube to it and let the gas pass through the testing solution for exactly fifteen seconds, then adjust the operations of the machinery until the same color is obtained in fifteen seconds with three inches pressure of gas as is given by the test with the pure iodine solution and the machinery will operate normally to ours.

After having established this state of affairs it is easy to compensate for varying strengths of gas by raising or lowering the pressures in the gas line. For instance, if the gas is weak, by increasing the pressure until the normal color is obtained in fifteen seconds the same quantity of so-called ozone will be delivered to the experimental rooms.

The precautions, so far as the actual testing is concerned, consist of absolute adherence to the method in all of its details and closely watching the rubber tube as the gas will soon break through it. If such is the case, the test is of no value.

The gas must come from the engine room, carried in brass pipes, in large volumes (fully ten times the quantity actually required) and as quickly as possible and must pass the distributors which are in operation before being tested, for the reason that all tests must be taken after passing the point at which the gas is being used, this being necessary as the gas may lose as much as twenty per cent. of its strength in travelling one hundred feet.

THE SECONDARY CHARACTERISTICS OF SO-CALLED OZONE

At one time we made a pretty thorough investigation of the germ life both in and around the rooms used for applying the treatment to the animals.

This investigation disclosed the fact that there were practically no germs of any kind in the rooms where the gas was used and further disclosed a very decided deficiency of germ life not only in the whole building, but also in the neighborhood of the building.

Such results seem to make it apparent that if hospitals were placed under say not over one per cent. of ozonized air uniformly mixed with air by means of a distributor, that it would almost end the trouble, now so prevalent, caused by contagion and secondary infections.

It would also appear reasonable to expect success from the treatment of unhealthy wounds with ozone mixed with air. As we have stated in another place, the use of ozone without first diluting it with a *large* and *constant* quantity of pure air is in our judgment *exceedingly dangerous*.

It is also apparent that its use should be constant, and protracted, treatments for short intervals can accomplish little benefit as accomplished oxidation requires long intervals of constant exposure to the oxidizing action of the gases.

THE POWER PLANT

The description here given of our power plant is for the purpose of enabling others to reproduce our operations if necessary.

The operation here shown is based upon the principle of forcing the air through the generators, a method which may be abandoned in favor of operations based upon drawing the air through the generators.

As the mechanical operations are as yet not fully suited to the problem, no drawings are used.

We have three ordinary "Root" rotary blowers with six-inch inlet and discharge, their capacity being regulated by the speed at which they are driven; one to drive the air to the animal rooms and two for the gas.

All gas machinery is in duplicate throughout in order to prevent the necessity of closing down in case of an accident; in case of an accident to the air blower we could quickly connect the air lines to the extra gas blower and utilize it for delivering air until the other was repaired.

We have two small dynamos specially wound for "ozone" generation, two transformers and two "ozone" generators, the whole plant being driven by a steam engine through an overhead shaft.

As to the manufacture of the gas, the atmospheric air is drawn into the system through a stack sixty feet high, protected from rain by a cone top.

Drawn to the blower, the air is compressed and driven forwards through the system, passing first to the "ozone" generator where it is acted upon by the high tension current and a portion of it converted into so-called ozone. It is then carried in two-inch brass pipes to the rooms under an initial pressure of ten to twelve inches of water; the object being to send as much gas as possible, and as quickly as possible, through the pipes from which the rooms draw their supply.

After the main pipe line has passed through all the points of distribution the gas reaches a water gauge and a brass gate valve. By partially opening or closing this valve, the pressure of the gas is raised or lowered at will in order to compensate for changes in its strength.

In the piping system just after leaving the "ozone" generator a four-inch brass line, equipped with a gate valve, is attached and carried to a stack or other convenient outlet and by opening or closing on this gate valve we regulate the quantity of gas which is sent forwards to the experimental rooms. As the gas frequently loses as much as twenty per cent. of its strength in passing through one hundred feet of pipe, it becomes very necessary to move it quickly.

Any variation in the speed of the engine, as it is multiplied sixty-six times by the transformer, causes a variation in the quality of the gas and in order to aid the engine governor, we have placed a steam regulating valve on the main steam line at the engine. This valve is set at fifty pounds, and as our steam never falls below this pressure, we are enabled to maintain an almost constant speed.

Several years ago we discovered a very peculiar thing in regard to the manufacture of this gas. We had been much troubled by the fact that we could not make a strong gas in the summer; in the winter it was satisfactory but in the summer it was irregular and weak and the trouble became so serious during the summer of 1910 that it became necessary to stop everything else and concentrate on this problem.

After many disappointments and failures we in the end discovered that the manufacture of the gas depended upon a ratio being established, the essential features of which were the initial temperature of the atmosphere from which the air was originally drawn and the quantity which passed through the "ozone" generator

To cool or warm the air in the pipes before it reached the "ozone" generator did not seem to accomplish the purpose, the question always working back to the temperature of the original outside air and in the end we clearly established the fact that when the weather was very warm we required less air passing through the generators than when it was cool; in other words, we uncovered the very strange fact that the quantity of air passing through the generators should be inversely as the temperature of the original air used; which in its practical application simply meant the hotter the day the less the quantity of air passing to the generators.

The fact once known can be met in a number of ways, as by changing the speed of the blowers, or by partially closing off the supply of air to them. We are now controlling it by means of a gate valve provided with a scale and indicator which show the exact position of the gate. When the weather becomes so warm as to interfere with the strength of the gas we close this valve and reduce the volume of the air to the point necessary, and when the weather cools off we open the valve, thus regulating the strength of the gas to our needs.

The questions involved in the machinery to be used for this work are of great importance and we shall very probably have to design, to a large extent, our own machinery in order to get the necessary stability and reliability.

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